THE JOURNAL OF MEDICAL EDUCATION

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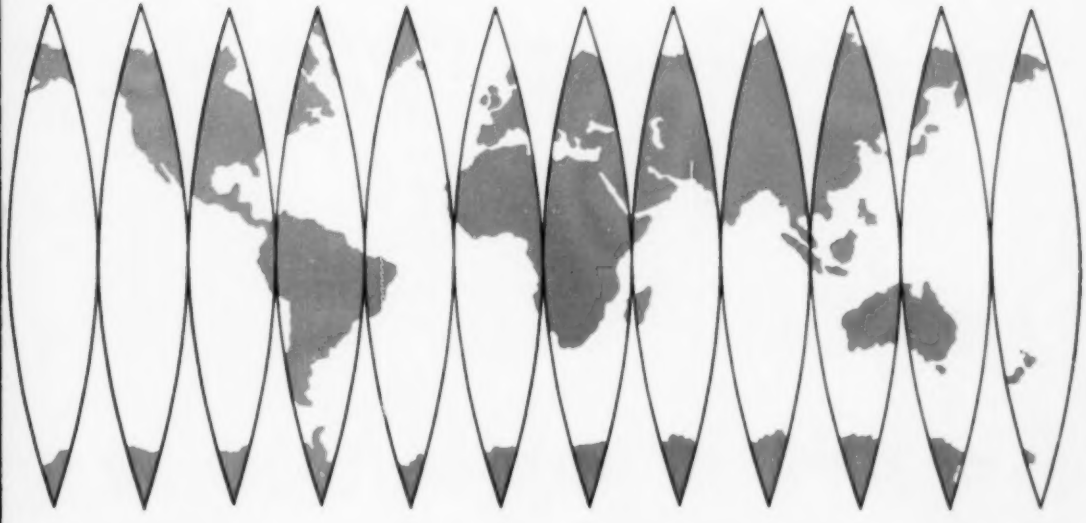
SPECIAL INTERNATIONAL ISSUE



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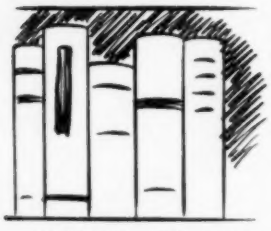

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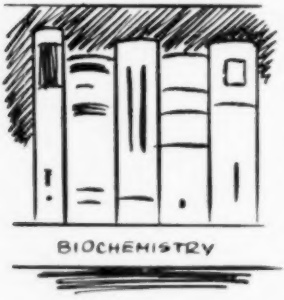

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The Journal of Medical Education serves as an international medium for the exchange of ideas in medical education, as well as a means of communicating the policies, programs, and problems of the Association. The Editorial Board welcomes the submission of manuscripts concerned with the broad field of medical education; this includes preparation for medical education; the medical school experience; intern and resident education; graduate and postgraduate medical education. The Editorial Board recognizes that medical education includes the activities of faculty, students, administrators, and those of the practicing profession who also teach and learn. Thus, it invites communications from any of these sources.

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Galley proofs will be mailed to authors for correction before publication and should be returned within 48 hours after receipt.

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News from the Medical Schools: Material for this section should be transmitted to the News Editor, Miss Neva Resek, 2530 Ridge Avenue, Evanston, Illinois. Announcements of major faculty and administrative appointments, news of distinguished visitors and significant educational developments will be included. It is not possible to publish notices on grants-in-aid for scientific research.

Items of Current Interest: Audio-visual news and notices from national and federal agencies appear in this section.

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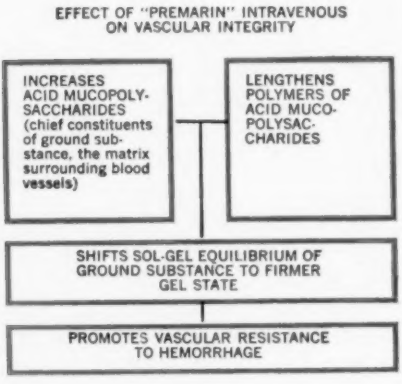
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ASSOCIATION OF AMERICAN MEDICAL COLLEGES

72nd Annual Meeting, Nov. 13-15, 1961

Queen Elizabeth Hotel, Montreal, Canada

1961

SEPTEMBER

AMERICAN ASSOCIATION OF MEDICAL CLINICS, Barbizon Plaza Hotel, New York, Sept. 27-29. Dr. Joseph B. Davis, Davis Clinic, 131 N. Washington St., Marion, Ind., Secretary-Treasurer.

AMERICAN ASSOCIATION FOR THE SURGERY OF TRAUMA, Drake Hotel, Chicago, Sept. 28-30. Dr. William T. Fitts Jr., 3400 Spruce St., Philadelphia 4, Secretary.

AMERICAN HOSPITAL ASSOCIATION, Atlantic City, Sept. 25-28. Mr. Maurice J. Norby, 840 North Lake Shore Dr., Chicago 11, Secretary.

COLLEGE OF AMERICAN PATHOLOGISTS, Seattle, Sept. 30-Oct. 3. For information write: Dr. A. H. Dearing, Prudential Plaza, Suite 2115, Chicago 1.

OCTOBER

ACADEMY OF PSYCHOSOMATIC MEDICINE, Emerson Hotel, Baltimore, Md., Oct. 12-14. Dr. George Sutherland, 3700 N. Charles St., Baltimore, Program Chairman.

AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY, Palmer House, Chicago, Oct. 8-13. Dr. William L. Benedict, 15 Second Street S.W., Rochester, Minn., Executive Secretary.

AMERICAN ACADEMY OF PEDIATRICS, Palmer House, Chicago, Oct. 2-5. Dr. E. H. Christopherson, 1801 Hinman Ave., Evanston, Ill., Executive Director.

AMERICAN ASSOCIATION OF MEDICAL RECORD LIBRARIANS, Benjamin Franklin Hotel, Philadelphia, Oct. 9-12. Miss Doris Gleason, 840 N. Lake Shore Dr., Chicago 11, Executive Director.

AMERICAN COLLEGE OF GASTROENTEROLOGY, Hotel Cleveland, Cleveland, Oct. 22-25. Mr. Daniel Weiss, 33 West 60th St., New York 23, Executive Director.

AMERICAN COLLEGE OF SURGEONS, Conrad Hilton Hotel, Chicago, Oct. 2-6. Dr. William E. Adams, 40 E. Erie St., Chicago 11, Secretary.

AMERICAN MEDICAL WRITERS' ASSOCIATION, New York City, Oct. 6-7. Leslie L. Lewis, LL.B., Ravenswood Hospital, 1931 W. Wilson Ave., Chicago 40, Asst. Secretary.

AMERICAN SOCIETY OF ANESTHESIOLOGISTS, INC., Statler Hilton, Los Angeles, Oct. 22-27. Mr. John W. Andes, 515 Busse Highway, Park Ridge, Ill., Executive Secretary.

AMERICAN SOCIETY OF MICROBIOLOGY, Commodore Hotel, New York City, Oct. 31-Nov. 2. R. W. Sarber, 19875 Mack Ave., Detroit 36, Executive Secretary.

COLLEGE OF AMERICAN PATHOLOGISTS, Olympic Hotel, Seattle, Oct. 1-7. Dr. Arthur H. Dearing, Prudential Plaza, Suite 2115, Chicago, Executive Director.

POSTGRADUATE ASSEMBLY IN ENDOCRINOLOGY AND METABOLISM, Bethesda, Md., Oct. 2-6. For information, write: Dr. Roy Hertz, National Institutes of Health, Building 10, Bethesda 14, Md.

NOVEMBER

AMERICAN COLLEGE OF CHEST PHYSICIANS, Interim Session, Brown-Palace Hotel, Denver, Nov. 25-27. Mr. Ward Bentley, 112 E. Chestnut St., Chicago 11, Executive Assistant.

AMERICAN MEDICAL ASSOCIATION, CLINICAL MEETING, Denver, Nov. 27-30. Dr. F. J. L. Blasingame, 535 N. Dearborn, Chicago 10, Executive Vice-President.

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AMERICAN PUBLIC HEALTH ASSOCIATION, Cobo Hall, Detroit, Nov. 13-17. Dr. Berwyn F. Mattison, 1790 Broadway, New York 19, Executive Director.

ASSOCIATION OF MILITARY SURGEONS (68TH ANNUAL CONVENTION), Mayflower Hotel, Washington, D.C., Nov. 5-8. Col. Robert E. Bitner, U.S.A., Ret., 1726 Eye St., N.W., Washington 6, D.C., Secretary.

INTERSTATE POSTGRADUATE MEDICAL ASSOCIATION OF NORTH AMERICA, Cleveland Auditorium, Cleveland, Nov. 13-16. Mr. Roy T. Ragatz, Box 1109, Madison 1, Wis., Executive Director.

DECEMBER

AMERICAN ACADEMY OF DERMATOLOGY AND SYPHILOLOGY, Palmer House, Chicago, Dec. 2-7. Dr. Robert R. Kierland, Mayo Clinic, Rochester, Minn., Secretary-Treasurer.

1962

JANUARY

AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS, Palmer House, Chicago, Jan. 27-Feb. 1. Mr. John K. Hart, 29 East Madison St., Room 910, Chicago 2, Executive Secretary.

AMERICAN COLLEGE OF SURGEONS, SECTIONAL MEETING FOR SURGEONS AND GRADUATE NURSES, Statler-Hilton and Biltmore Hotels, Los Angeles, Jan. 29-Feb. 1. Dr. William E. Adams, 40 E. Erie St., Chicago 11, Secretary.

FEBRUARY

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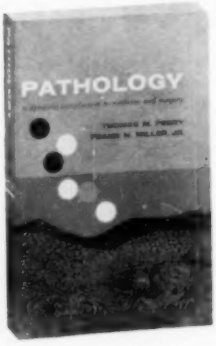

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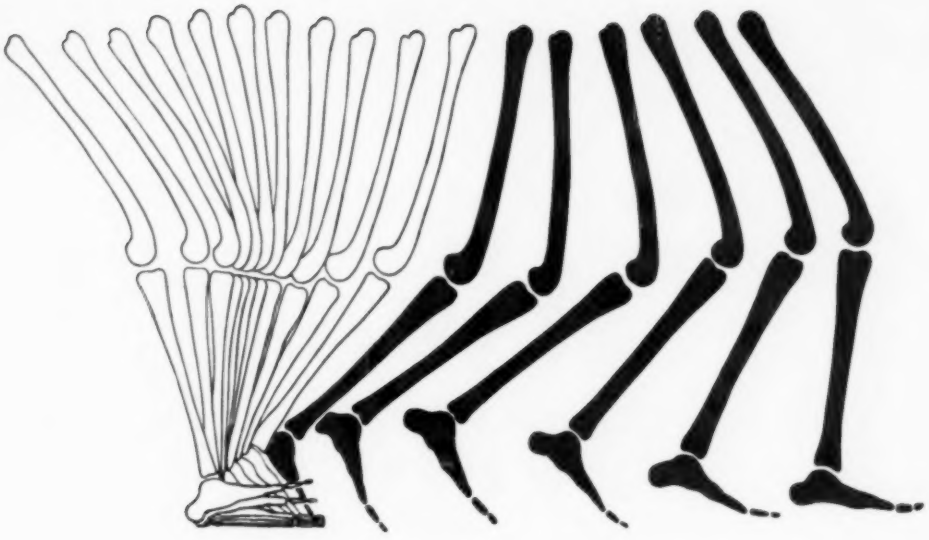

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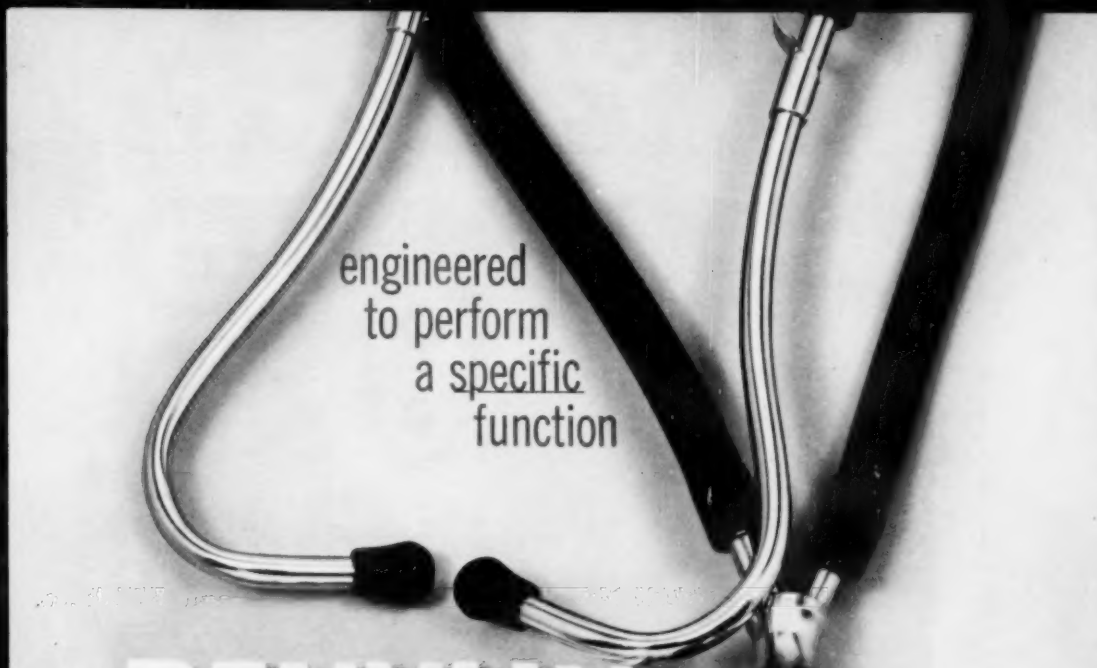

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The Journal of MEDICAL EDUCATION

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The Journal of **MEDICAL EDUCATION**
VOLUME 36 • NUMBER 9 • SEPTEMBER, 1961

Foreword

Two years ago the Association of American Medical Colleges published a special international number of this journal. The developments in medical education around the world, as well as the enthusiastic reception accorded the earlier number, indicate the desirability of gathering another group of reports from many lands.

Medical education in the world is dominated by the need for more physicians. As new medical schools are established, opportunities for reviewing and revitalizing curricula, fresh approaches to student selection, and new ideas on the design of teaching facilities become apparent. Medical faculties in many countries are enthusiastically experimenting in medical education.

The compilation of this international number has been a pleasant educational experience for the editorial staff. The remarkable cooperation of our overseas colleagues in preparing thoughtful and comprehensive reports on their countries or regions has been particularly gratifying. This is solid evidence of the international interest in medical education.

In an effort to enhance the impact of these reports, we have included summaries in Interlingua. Five hundred copies of this international number will be distributed at the meeting of the World Medical Association in Rio de Janeiro, September, 1961. A copy will be forwarded to each medical school in the world, and additional copies will be made available to foundations and agencies concerned with international aspects of medical education. We hope that these efforts will further enhance the role of this Journal as the medium for communication in the world of medical education.

A note of appreciation goes to the Josiah Macy, Jr., Foundation for financial assistance in this program.

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Medical Education in International Perspective

EDWARD GRZEGORZEWSKI, M.D.*

World Health Organization, Geneva, Switzerland

SUMMARIO

Le disveloppamento del concepto de medicina como un scientia international, e su principios basic son revidite. In le historia complete de medicina, post su emergentia ab le stadio initial de magia e empirismo imperfecte, nulle pais singule ha potite remitter se a su proprie ressources durante qualque periodo de tempore. Uno del functiones importante del Organisation Mundial de Sanitate (OMS—WHO in anglese) in education medical es de servir e de stimulo e de terreno de intendimento pro le excambio de ideas e experientias que disveloppa in omne regiones del mundo. Non-obstante, in despecto del facto que progresso in scientias medical e in medicina clinic ha diffundite rapidemente in omne partes del mundo, movimentos in education medical non sembla transversar facilemente le frontieras, ni mesmo a iste tempore de contactos international intensive. Un carga particularmente defiante pro le OMS, es de projectar e de establir nove scholas medical, specialmente in le paises novemente independente; alicun principios son mentionate in iste connection. On expecta que le Conferentia Mundial super Education Medical, co-patronisate per le Association Medical Mundial e per OMS, que analysava a fundo multe problemas international de education medical, producera un influentia constructive e longeve super scholas medical in omne partes del mundo. On vide un tendentia promittente in le facto que clarification del objectivos de education medical subgraduate recipe al presente multe attention in plure paises, independente del nivello de lor disveloppamento. Le interesse in reformar education medical in conformitate con le necessitates cambiante de societate e le progresso de scientia se ha manifestate etiam in alicun paises que, usque recentemente, semblava satis satisfacite con lor systema (e.g., Francia, ubi un major reforma de education medical es a esser introducite in 1961/62). Omne reformas recente de curriculo in le varie paises monstra un orientation de medicina verso problemas social, proque on placa emphase crescente super medicina preventive e social, con conceptos allargante semper. Le objectivos de education medical, como proponite in le varie paises, pote esser gruppate in duo categorias: uno relative al preparation pro activitates professional practic le plus tosto possibile post graduation, e le altere visate principalmente al establimento de fundamentos scientific, lassante a un stadio plus tarde su application practic. Ambes de iste patronos se trova in practicamente omne patronos de education medical hodierne, ben que in proportiones differente e con varie grados de emphase. Major differentias existe, quamquam, in le nivello de inseniamento requirite pro ganiar iste scopos, e iste facto mena a un problema multo seriose in co-operation international. Ergo le maestramento e orientation del personal docente recipe attention particular in programmas OMS, proque iste es le melior modo de complir le objectivos principal que guida omne activitates OMS re education medical super un plana international. On pote resumer iste objectivos como seque: (1) le establimento de programmas national realistic in omne paises basate super lor necessitates e conditiones; (2) assistenia a elevar le standardes de maestramento ubique, per le disveloppamento de institutiones national e regional, a nivellos compatibile con le carga de personal de servicio sanitate; e (3) le reinfortiamento e melioration de co-operation international pro utilisar plus effectivemente, in le interesse del sanitate de omnes, le ressources de maestramento e recerca in le varie paises del mundo.

I. AN ATTEMPT AT AN INTERNATIONAL OUTLOOK

Because of its roots, its goals, and its applicability, medicine is with good reason looked upon as an international science and a part of a world-wide civilization.

In the past, the desire to share with others the benefits of medical knowledge was characteristic of all truly great centers of medical learning in the East and the West, which, at the time of their

* Director, Division of Education and Training.

flourishing, spread medical knowledge far beyond the boundaries of the countries.

Outstanding medical achievements sometimes place one or another nation ahead of the others and make her the example and teacher. However, so far in history, such a leading position has usually been rather limited in time and scope; no single center, no single country—no matter how powerful—has been able to rely exclusively on its own resources and "endogenous" stimuli for any length of time. Even in the brief yet rich history of modern medicine, the growth and decline of medical science, art, and teaching, may be observed in different countries.

In several foci of civilization scattered around the globe, where medicine emerged above the initial stage of magic and crude empiricism, some principles evolved which gradually grew into the foundations of various medical systems, often amazingly resembling one another in spite of the widely different places and conditions of their origin. These principles can be characterized by: scientific approach to professional activities; charitable and ethical approach to the patient; and constructively critical and understanding attitude toward the environment. These were also the aims of medical education in every great center of medical learning throughout history: in the ancient Near East countries, in Brahmanic and Buddhist India, in China, in ancient Greece, in the great age of Islamic civilization, perhaps in pre-Columbian America, in European renaissance, and now in our modern medicine.

These fundamental principles appear as universal and permanent values in medical education. It seems that medicine has attained a high level only when and where these values have been imbued in its adepts and have been faithfully adhered to. Their universality is our security against ephemeral illusions of extremisms and other downfalls, which from time to time result in the decline and degradation of medicine.

One of the important functions of WHO in medical education is to serve both as a stimulus and as a meeting ground for the exchange of ideas and experiences developing in all corners of the world. It also serves as a center from which these developments can be observed and studied. Thus, WHO's interest in medical education is not limited to its direct activities, such as projects of assistance to institutions or cooperation with its member countries, although it tries to apply in its direct action the results of its study of both world-wide and narrower local trends.

When approaching a problem in a foreign country, an educator's background creates a natural bias in favour of his own national experience; but one of the challenging obligations in international work is to reduce this bias by an effort to learn, and to understand the reasons for differences between the various national patterns. How often a foreign educator is tempted to assess progress in the developing country by the degree of resemblance to his own! This is more likely to occur when his experience is limited to only one pattern. His usefulness would increase if he were acquainted with the different systems developed in various countries.

Another bias comes from concentrating attention on the *pace* and level of development of a country or community, whilst giving little consideration to the *direction* in which this development goes. An internationally assisted training programme can succeed in the long run only if its purposes and methods are compatible with the direction of the national progress, which includes historical, geo-political, socio-economic, and other considerations.

Medical education in most of the

advanced countries has become a national institution so deeply rooted in their life and traditions, so closely connected with the environment which determines its structure and its functioning, that it could hardly be transplanted into another set of circumstances. However, where the circumstances require the application, at least in part, of a foreign pattern elsewhere, it is essential to differentiate between those elements potentially useful in the foreign ground, and those which represent nonessential local cultural accretions of the more advanced country.

It seems that, whereas progress in medical sciences and in clinical medicine spreads relatively quickly throughout the world, movements in medical education do not travel easily across the boundaries even now in the time of intensive international contacts. It is surprising to see that medical educators in many instances do not show much interest in the educational work of their colleagues even in the same subject and in the same country. Quite often the introduction of more advanced or progressive teaching in one subject has no effect on the teaching in other subjects in the same school, or in the same subject in other medical schools in the country. This may be partly due to the nature of the educational process itself, which is less dramatic, and consequently less liable to "infect" other teachers, than the introduction of a new procedure in diagnosis or treatment. Another reason may be that many medical educators show more interest in the content of their subject than in how to help their students to assimilate the knowledge.

Another rather significant phenomenon can be observed in the countries where leaders in medical education have studied abroad and, impressed by the country of their studies, wish to develop medical education along the same lines. Not seldom they have not continued to follow sufficiently closely the developments in the country of their studies after their return home, and they still advocate the pattern of some 20 years ago which has since been modified and improved. It is most doubtful that out-dated foreign models would fit even a "less-developed" country of today.

Medical literature and other educational media in many countries give relatively more attention to the achievements of their nationals than of foreigners. Except for a number of universally recognized names, medical publications and, particularly, textbooks mention more often the names of those who published in the same language than in others. This rather understandable phenomenon presents some problems, as, for instance, when medical progress is attributed to the contributions of the various national or linguistic groups. Attempts have been made in some countries to review medical history so that the contribution of those who worked and published in the less-known languages might be duly recognized. This trend to appreciate the "forgotten men," not only of the medical past but also of its present, may well deserve some place in international education cooperation.

Advice and assistance in the planning and establishment of new medical schools are particularly challenging tasks, but cooperation in the reform or re-orientation of medical education undertaken by the country can also provide much scope for worthy effort.

A few guiding principles might be worth mentioning in this connection. Not only one, but different patterns of medical education should be studied as to the usefulness of their individual elements for the needs and conditions of the country assisted. Should the country be under the cultural influence of centers located in another country or countries, the pattern of medical education

of the latter is particularly carefully considered in this respect, but it is neither automatically accepted as the most suitable one, nor is it *a priori* rejected in favour of the pattern of origin of the adviser. The acquaintance of educational personnel and of the temporary educational consultants with the essential features of the different patterns of medical education is one of the main guiding principles in their work.

The above has particular importance in setting up medical schools in the new independent countries. The pattern of their former "parent states" is not taken for granted as the most suitable for the new country, nor is another foreign pattern offered for transplantation; but a selection of elements is explored coming from the experiences which may best fit the local needs and conditions.

In order to understand better these needs and conditions, the competent and interested local groups are consulted and encouraged to cooperate among themselves in the further planning and developing of medical education in the country. These groups usually consist of at least the health authorities (who are responsible for the general health of the people and are often the future employers of most of the health personnel in training), the medical profession (who know the conditions of medical work), and the educators (who know the level and potentialities of the students). In the countries with planned economies, the participation of the national planning authorities is essential for an assessment of the proportion of national income which can be spared for the necessarily costly medical education. On the basis of studies in many countries, mainly of Asia, a tentative list of suggestions has been prepared in connection with the establishment or strengthening of medical education in a less-developed country.

II. GLIMPSES ON TRENDS AND DEVELOPMENTS

Medical education is strongly influenced not only by medicine and by education, but also a number of other factors such as scientific progress, economic conditions, social, cultural and political traditions and developments, and this complex makes it impossible to give in an article a balanced picture of the subject in its world-wide perspective. Instead, one may endeavour to single out a few issues illustrating trends of more than local significance.

The education of medical undergraduates is given in some 670 medical schools in 80 countries, and every year some 65,000 new graduates join the ranks of more than one million doctors of the world. The growing number of medical schools only partly reflects the need for training facilities for doctors throughout the world, because many countries desirous of establishing medical schools do not have sufficient resources or the conditions necessary for this purpose.

In the countries with an educational and economic level permitting the establishment of medical schools in proportion to their needs, a spontaneously formed ratio can often be observed of one medical school per 2–3 million inhabitants. Obviously, many other circumstances, in addition to the size of population, influence the number of medical schools even in the developed countries—for example, density of population, network of communications, geographical and cultural characteristics of the regions within the country, etc. However, it is interesting to observe that, for instance, in Denmark, Finland, and Norway, second medical schools were opened when the population had grown beyond the above-mentioned mark.

In addition to these data on education in "non-systemic" scientific medicine, there are many schools limited to

certain cultural areas where systems are taught based on a specific idea, concept, conviction, or tradition. Examples of such education can be found in India, Ceylon, China, some countries of Europe, and U.S.A.

Ayurveda, Unani, acupuncture, chiropractice, homeopathy, and a few other systems have training institutions where the healing art and hygiene are taught in accordance with the principles of each. In some places the elements of a specific system are studied in the modern medical institution,[1] and, vice versa, some elements of modern medical science are taken up by certain "systemic" schools.[2] It is difficult to say how far these endeavours will eventually result in the integration of all sources of medical experience and of all types of medical training. In some Universities, schools of "indigenous," i.e., traditional Ayurvedic and Unani medicine, are functioning parallel to the usual "non-systemic" medical college course.

Developments in medical education in the different areas of the world are influenced not so much by geography itself, as by cultural and other links between the countries. Trends in the countries of Africa or Asia, where English is used as the official or working language, are more influenced by movements in English medical education than by the neighbouring countries where, for example, French is spoken, and where the ways of teaching medicine in France are mainly reflected.

The recent acquisition of independence by many countries in Africa has stimulated their interest in advancing education at all levels, including the study of medicine. So far, active planning of new medical schools has started in Morocco, Tunisia, Ethiopia, and the Federation of Rhodesia and Nyasaland. Many other countries which would like to have their own medical schools have not yet a sufficiently widespread system of secondary education nor adequate resources for the establishment of institutions of higher learning. However, it is hoped that, with their rapid economic and cultural development, conditions will soon make it possible to envisage many new medical schools in Africa. At the present time, the possibilities are being explored of rapid expansion and improvement of general educational facilities and of the training of health personnel at auxiliary level and in such professions as nursing, midwifery, and sanitation.

It is rewarding to notice the increasing interest in medical education, not only among the educators, but among such groups as public health administrators, community leaders, social security organizers, and others responsible for the maintenance and promotion of health. For example, several regional committees of WHO composed of government representatives, selected educational subjects as topics of their annual discussion, and regional conferences on medical education are taking place or are scheduled in almost all regions.

It is expected that the two World Conferences on Medical Education, cosponsored by the World Medical Association and WHO (in cooperation with some other international groups), which thoroughly analysed many international problems of medical education, will produce important constructive and long-lasting influence on the medical schools throughout the world.

Aims of teaching.—The education of a medical man is a continuous process of "growth and development" throughout his life, and his student years in the medical school constitute only a relatively short although intensive part of this process. The shortness of the time available, the amount of material to be

[1] e.g., in acupuncture in China.

[2] e.g., in the Hindu University School of Ayurvedic Medicine in Benares, India.

absorbed and assimilated, the strain of adjustment to a new environment and new relationships, establish a natural limitation to the purposes of the teaching.

Clarification of objectives of medical undergraduate education is receiving much attention in several countries, independently of the level of their development. Some very advanced countries study the ways in which the aims of medical education should be modified in relation to the changing times; in other equally advanced countries there seems to be a passive acceptance of the traditional aims of medical education, and no need is felt for the formulation of more specific objectives. In the new independent countries, however, and in those striving for rapid development, considerable interest can be observed in setting the objectives in conformity with the world trends on one side and the local needs on the other.

In the broadest sense the objectives of medical education put forward in the various countries can be grouped in two categories; one concerned with the preparation for practical professional activities as soon as possible after graduation from the medical school, and another aimed mainly at the establishment of scientific foundations leaving the training in their practical application to a later stage—i.e., after graduation. Both elements are present in practically all patterns of medical education, but in different proportions and with different degrees of emphasis. Urgent needs of a social nature sometimes result in putting the greater emphasis on the practical preparation of the student, but there is almost a universal acceptance of the need for the solid scientific basis even in less developed countries which do not want to compromise on the scientific quality of the doctor. In practice the scarcity of teaching resources, and other circumstances, often do not permit the achievement of either of these desirable goals no matter how well formulated.

The clarification of the purposes of medical education has been the subject of thorough study in many international conferences, leading to some suggestions as to how each country and each school may establish its general and more specific objectives. The reflection of these discussions can be observed in a number of countries, and the idea of keeping under review the school's objectives, in relation to the adequacy of its teaching programme, is definitely gaining momentum.

Whereas the main two aims of medical education continue to be the inculcation of a scientific base and the practical skills (in addition to matters of attitudes and ethics), a third area of purpose is becoming recognized in some countries, viz., acquaintance of the student with the *functioning* of medicine in relation to professional, social, and economic patterns and their trends. Opinion differs as to how much of this orientation should take place during the undergraduate studies and at other stages of training, but there is an increasing tendency to prepare the student for medical work in the "open community" and not only in the hospital environment, as has been, and still is, the situation in most medical schools.

This object requires a variety of teaching resources and teaching methods in what is often referred to as "community medicine." It introduces the student to the process of applying the scientific component of medicine with the resources available in the community, cooperating with other health workers on the one hand and approaching the home and work environment of the patient on the other.

For this purpose, extra-mural teaching facilities, such as health centers, field demonstration areas, family health care programmes, etc., are used in many

schools. The degree of success in the teaching of community (or social) medicine is far from being uniform, and it seems that the result depends here more on the teacher's personal talents and organizational ability than is the case with other parts of the curriculum. This is naturally a limiting factor.

Varying levels of medical education.—Although the diplomas issued at the end of medical studies differ in their title and with regard to the rights conferred on the new graduates, it has been often understood that, since the bases of medical science are roughly the same everywhere, the level of professional knowledge of the young graduates is more or less comparable except for natural differences due to individual ability, diligence, and personality. This might have been true when "modern" medical education was centered in the relatively few well-known universities in Europe, which were in close contact through a continuous flow of teachers and students with Latin as a common language of study and with much similarity in social concepts and structure in the different countries.

Various factors like the progress of science, social changes, the establishment of medical schools in the countries at different levels of cultural development, have resulted in considerable differences in the level of teaching in the different schools. The growth of the scientific content of the medical curriculum requires rapid adjustments in teaching methods, and an increase in the complex teaching resources. Since only relatively few countries can continually provide their schools with numerous and highly qualified faculty, and with the teaching equipment and other facilities necessary for modern education of the doctor, there is a danger that the range of the differences in the level and type of medical graduate from different schools may rather increase than decrease. On the national scale, in many countries standards of medical education are maintained and gradually raised by a number of methods, including machinery for the establishment and supervision of these standards, although even these devices do not prevent a certain degree of difference between the individual schools.

The differences in the levels of medical education in countries with different economic and scientific potentials lead to a very serious problem in international cooperation, and particularly in its most active programme of postgraduate training abroad. In most instances, full benefit of such training at the advanced level can be taken only by those students who have been adequately trained at the preceding levels of their medical education in their home country. Where schools giving basic medical training do not keep pace with the progress of science and other aspects of modern education, a chasm appears between their medical graduates and those coming from other more advanced schools. In turn, the receiving postgraduate institution justly wants an assurance that its students can be entrusted with the medical and scholastic responsibilities of its advanced training programme: hence, a search for a set of acceptable basic common denominators of knowledge a medical graduate should have throughout the world in order that a universal significance of the medical diploma be maintained, naturally with simultaneous encouragement to raise wherever possible the level of training above these minimum standards. Whether agreement on any elements of such standards is possible, and whether their introduction is feasible and practical, remains to be seen. At any rate, various measures should be applied in order to bring the benefits of medical knowledge to all countries which need them.

The methods of establishing educational standards applied in various coun-

tries can be grouped roughly in three categories:

a) Those which fix the content and form of examinations, with or without indicating how the candidate should prepare themselves; this method puts emphasis on checking the level of knowledge shown by the candidates;

b) Those which outline the programme of instruction, sometimes in considerable detail;

c) Those which lay down the conditions in which instruction is given, such as quality and quantity of training facilities, qualifications of teaching staff, ratio of teachers to students, etc.

In its pure form the first of these categories emphasizes the knowledge to be shown by the candidate without concern about how he obtained it; the second emphasizes the content and methods of training; and the third allows for more flexibility in the programme and in the checking devices in the belief that satisfactory results should be obtained if training takes place in the proper conditions.

In most instances national systems combine the elements of all three groups with more emphasis on one or another characteristic. For example, examinations are more relied upon as a principal device for maintaining some uniformity in standards in the British system of medical education, whereas in the U.S.S.R. detailed programmes of courses achieve this object (notwithstanding the use of examinations), and in U.S.A. the actual conditions in which training is given receive most attention.

All these methods are based on the assumption that the knowledge, skills, and attitudes acquired by the candidate to a medical degree reflect the achievement of a desirable educational goal. These goals, however, differ in different countries, and even in the same country often change with time. In several countries the university medical education aims at preparing the graduate for the practice of medicine, in others it aims only at giving him some bases on which he can develop practical experience, for instance in the hospitals outside of the medical school, before he is authorized to engage independently in medical practice.

Therefore, it seems that common standards of professional and academic education in medicine are conceivable only to the extent that the countries and institutions for which these standards have been established have common specific aims of medical education.

The tendency to establish standards of conditions and performance in teaching institutions is a relatively young device, which, however, seems to gain ground in a few countries, with growing interest in others. The hospital audit practised by the American Hospital Association and APHA standards for health work, as well as the measurable norms of performance applied in U.S.S.R. and several countries in Eastern Europe, could be adapted to the needs of teaching institutions in different countries in due course.

Quite a different problem in regard to the levels of medical training exists in a few countries, mainly in Asia, where medical schools were established on two distinct levels: one for the training of fully qualified physicians, the other for "medical licentiates" with somewhat limited prerogatives.

The differences in the educational entrance requirements and in the length of medical training between the two schools were rather small. Gradually it has been recognized that the maintaining of two such levels of medical personnel is not justifiable and, for example, in India the lower level training has been abolished. However, a few countries still continue the two-level pattern for various local reasons.

The organization and administration

of a medical school with all its multiple problems requires leadership and competence in educational, medical, and administrative matters. In addition, since the training programme is based on the cooperation of many institutions, the coordinating functions of the head of the school need much of his attention. Hence a trend visible in countries with otherwise different educational patterns to introduce continuity and high administrative competence in the running of medical schools. Permanent career executive officers in the capacity of dean, director, assistant dean (or with some other title) appear instead of, or in addition to, the traditional rotating dean whose main functions were rather to represent and preside over the faculty. A new type of professional medical education administration is emerging.

This is very visible in the U.S.A. In U.S.S.R. the removal of medical and related education from the universities, and the establishment of partly separate programmes for early specialization in general medicine, pediatrics, and public health, has created a need for medical educational administrators to direct the new type of training institution—the director of "Medical Institute"—in addition to the deans of the individual schools within the Institute.

A few schools in the United Kingdom have appointed full-time long-term deans, and some schools in Latin America have had very good experience with long-term directors who assure the continuity of the work under the traditionally elected, limited-term deans. In several countries in Asia, e.g., in India, Pakistan, Ceylon, the head of a medical school, usually called Principal, is appointed by the relevant governing body (depending on the organizational status of the school) for long periods of time and has considerable authority in administrative and other matters.

Nevertheless, in other countries in all parts of the world, the traditional arrangements still continue, the Faculty Council remaining the main source of authority directing the school affairs, with the Dean as a temporary representative and executor of the Faculty's wishes.

The dynamic approach in many countires to the problems of medical education in the desire to improve it is encouraging, and it is particularly significant that, in several countries with a traditionally high standard of education, important steps are being taken in studying and reforming its pattern. For instance, constructive critical studies of medical education in the U.S.A. and Great Britain have produced beneficial results, not only in the country itself, but are also favourably influencing developments in many parts of the world. U.S.S.R. India, Sweden, Japan, and many other countries, have also introduced important changes in their system of teaching of doctors.

The interest in reforming medical education in accordance with the changing needs of society and the progress of science has manifested itself even in some countries which until recently seemed to be fairly satisfied with their system and did not see the need for reform beyond slight adjustments in the content of curriculum. A major reform of medical education in France is to be introduced with the academic year 1961/62. The reform envisages several steps—e.g., the establishment of the university hospital centers; close coordination of teaching appointments with the hospital appointments; abolition of the premedical year of studies (PCB), but strengthening of the basic sciences in the medical curriculum proper. Clinical studies are to begin somewhat later than has been the case until now, but hospital experience is to be given to all students and not only to those selected through voluntary com-

petition (concours d'externat). Many full-time appointments of teaching staff are also envisaged. Preventive and social aspects of medicine will be emphasized.

Studies on the reform of medical education have started in some universities in Switzerland. In Zürich, a department of preventive and social medicine is to be established; and in Geneva an interdepartmental programme of lectures in this subject has been organized, and a modern oriented department is planned for the near future.

The complexity of the tasks in a modern medical school requires impressive teaching resources and facilities compatible with the level of modern medical science and practice. This particularly refers to the increase of the teaching staff in number, quality, and level of specialization. The trend toward full-time appointments is visible in most countries but in different degrees. Satisfactory staffing of medical schools is almost a universal problem, far from being solved. On the other hand, an increase in the number of students is generally avoided, and although views on the optimum number of students vary in different countries and depend on many circumstances, a figure of 100, or only slightly higher, is often recommended as the size of the medical school class. There are, however, schools admitting as many as 1000 new students, and even more, for the first year, which in most cases cannot create proper educational conditions for medical education. In some countries, mainly in Europe and in Latin America, limitation of the number of admissions is often opposed because of the concept that a person presenting a proper school certificate should be entitled to enter any public academic school of his choice. In some (very few!) of these countries, the balance between the teaching potential of the medical schools and the influx of students is relatively well kept; in many others the quality of training seems to suffer very seriously.

With the rapid increase of the training resources necessary for modern medical education, its cost is also rapidly rising. The establishment of a medical school with an initial outlay of several million dollars for construction and equipment, and one million of annual budget, makes medicine probably the most expensive among the major branches of higher education. These figures are given as rough examples, and in reality the expenses deviate considerably in both directions: there are many much more expensive schools, and several for which these costs are almost prohibitive. Furthermore, the purchasing power of money differs from the exchange value of local currency to the dollar, so that the figures mentioned here may be actually lower in some countries than if merely calculated in relation to the dollar. Many countries with a low level of economy cannot face the difficult problem of providing adequate resources for their medical education, and the question of foreign aid and international cooperation becomes an urgent necessity.

The content of the medical curriculum should be a subject of constant revision and adjustment.

Among the subjects which begin to receive more attention, we can mention radiation medicine, medical physics, virology, nutrition, occupational medicine, and medical psychology. Changes in the age composition of population and other factors give prominence to cardiology, oncology, and genetics. However, the newer scientific advances do not everywhere find their way easily into the teaching, and there are medical schools where even such well established and essential subjects as pediatrics and psychiatry do not receive due attention. Emphasis on basic sciences continues to be felt in medical education, and, indeed,

efforts to strengthen that element at *all stages* of training of the doctor are noticeable in most countries. The orientation of medicine toward social problems, so vigorously advocated and accepted in principle in many quarters, seems to progress in direct relationship to the social sciences' ability to offer a tangible and practical contribution to the doctor's work.

The long-standing dilemma is still with us of what to include in the curriculum and how to accommodate within the teaching programme all the immense material necessary for the training of a modern doctor. Indeed, with the progress of science it becomes more and more difficult. The length of training is steadily increasing in the countries where this is possible, but even there the delay in the assumption by the doctor of his full professional functions creates serious economic, psychological, and other problems.

In an effort to make the modern course more manageable and capable of being more thoroughly digested by the average student, serious thinking is going on toward stream-lining subjects—teaching no more of one subject than is required for comprehension of its successor in the curriculum. Thus, sufficient anatomy (with physiology) to understand the principles of pathology, medicine, and surgery, with concentration on their refinements only for those in whom are seen the seeds of future adepts and teachers in these subjects. Teaching of preventive and social medicine is gradually growing stronger in many places scattered around the world. It is particularly gratifying to see the countries in Asia, Africa, and Latin America actively promoting this aspect of medical education. Perhaps no other subject has been in recent years the topic of so many meetings, international and national. Much progress has been made in the clarification of aims, programmes, and methods of social medicine; but in spite of these and other efforts, the teaching probably still depends more than any other subject on the individual talent and inventiveness of the teacher. On many occasions, and always in connection with the WHO Visiting Teams of Medical Scientists, a round-table discussion was held on the integration of preventive and social elements in the teaching of other subjects. In spite of the very different background of the members of the Team, coming from different countries and representing different specialties, it was always emphasized that every single subject in the medical curriculum has a good deal to contribute to the preventive orientation of the curriculum and a number of specific suggestions came out of such discussions.

Study groups, consultants and Expert Committees have examined the various angles of the subject, especially its relation to basic sciences and to clinical teaching. An Expert Committee Report, published in 1961,[3] entitled "The Teaching of the Basic Medical Sciences in the Light of Modern Medicine" expressed this in the following way:

> For long, the conception of prevention in medicine was virtually limited to the communicable and parasitic diseases, but during the present century, mainly through advances in biochemistry, the idea has broadened substantially to include also the many and widespread diseases that are the outcome of under- or over-nutrition. There are good reasons for believing, however, that the time is opportune for further enlarging the scope of the preventive outlook by interesting other scientific disciplines in its possibilities and embracing a still wider range of physical and mental disorders. Figuring prominently among the latter are those diseases of the body and

[3] Wld Hlth Org. techn. Rep. Ser., p. 209, 1961.

mind that have resulted from the rapidly increasing application of scientific knowledge to industrial processes and the accelerated *tempo* of production. Some of these occupational disorders are due to the direct effects of particular materials and technical methods employed and affect only those operatives who are engaged in some especially hazardous work; others are less immediately associated with specific tasks, and are dependent upon the urbanization of populations that inevitably accompanies the transformation of a predominantly agricultural population into an industrial society. These more general diseases of urbanization—especially tuberculosis—usually fall most heavily on the women and children in ill-housed and overcrowded communities.

In directing the minds of students towards the abundant possibilities for preventive measures inherent in modern basic medical science, everyone who takes part in the teaching of the basic sciences can make some useful contribution. In some subjects, notably in biochemistry and microbiology, the contribution is an obvious and accepted one; in others, however, such as physiology and psychology, the possibilities, though none the less real, may be less self-evident and still demand the enterprise of the explorer for their exploitation. The Committee attempted to review the opportunities offered by the principal medical sciences for fostering in the minds of students during their early years of study the concept of prevention as a major and growing contribution of modern medicine to the general welfare.

An interesting discussion among medical educators in U.S.S.R. has been going on in recent years on the instruction of medical students in the organization of health care. Views were expressed in favour of introducing more of the social medicine aspect of the subject into the teaching and research, in addition to the already strongly represented organizational element. The social sciences were expected to help in this approach. "Social hygiene," which corresponds roughly to the area now usually covered by "preventive and social medicine," was introduced as a subject and strongly developed in the medical schools in the earlier period of Soviet rule, but was later transformed into "the organization of health care."

A major development in the Soviet health service, the integration of the out-patient services[4] with the hospitals, has also reflected on the teaching of students particularly in the subject of organization of health care. Thus the guiding principles of Soviet health care, that of unity of medical care (i.e., diagnostic, curative, and preventive, on the one hand, and of intramural and extramural on the other) can be demonstrated in the teaching and in practice.

III. MEDICAL EDUCATION ACTIVITIES IN WHO'S WORK

Looking at the WHO activities in different countries and regions of the world one can easily observe that a considerable part of them is essentially educational. Every year about 1½ thousand fellowships and travel grants are awarded for studies abroad, and their total number from the beginning of WHO work has reached the 12,000 mark. In recent years about 17 per cent of fellowships have been in medical education. Teaching staff assigned by WHO on countries' request work in medical schools and in schools for other health workers. In 1960 there were 90 such WHO teaching staff in 24 countries, assigned usually for 2 or more years.

In Europe, where the individual countries request less direct assistance but prefer WHO to facilitate the inter-country cooperation, two-thirds of the WHO activities can be classified as educational. They consist of international courses,

[4] These usually very large "polyclinics" formerly functioned rather independently of the hospitals.

seminars, educational conferences, exchange of teaching personnel, and fellowships. In addition to such purely educational projects, many other activities in all regions contain substantial educational elements in them.

Much of WHO educational work, and particularly its fellowships, is based on the good will of the cooperating countries and over 1000 institutions which accept WHO fellows, very often without charge.

It is believed that the value of an international educational programme consists not only in raising the level of professional competence of health workers throughout the world, but also in the advancement of international understanding and the increase of faith in friendly international cooperation for which education is perhaps one of the best and most durable bridges.

The main purposes which guide WHO programmes in medical education can be summarized briefly:

1. to achieve the establishment of realistic national programmes in medical education in all countries, based on their needs and conditions;

2. to assist in raising training standards in all countries through the development of national and regional institutions to the levels compatible with the tasks of health service personnel;

3. to strengthen and further improve international cooperation so that the training and research resources in different countries may be utilized effectively in the interest of the health of all.

The educational programme of WHO reflects the great needs of the countries and the limitations in the efforts to meet them.

The imagination of the peoples and of many governments just after World War II has been captured by the progress in medicine and the health sciences, and by the potentialities of international cooperation. These great expectations gave rise to ambitious health programmes in many areas which seemed to forecast concentrated and successful attacks on ill-health throughout the world. A similar vigorous interest in rapid improvement of health is manifested in the many countries which have recently become independent. However, it soon became evident that among the many obstacles along this path at least two of the most important required long and patient educational action. One was the insufficient flow of medical and public health knowledge between the countries and between the linguistic and cultural groups of countries: the other was the shortage of adequate professional personnel for medical and health work in many countries. To overcome these handicaps (or at least to reduce their gravity) has become the goal of WHO's educational programme. Further experience with international work has confirmed that lasting results in any branch of public health can be achieved only if the programme is based on adequately trained and properly orientated local personnel. The seriousness and size of the problem are evident from such figures as the ratio of one doctor to 60,000 population in some countries in Asia and Africa, and larger, but still very low ratio in many others.

In medical education most of the WHO activities concentrate mainly on the following aims: to strengthen the teaching in basic medical sciences, preventive, social and community orientation of the curriculum, pediatrics, nutrition, and mental health, and to encourage the teaching of new important subjects as they appear on the horizon of medical progress—for example, radiation medicine, occupational medicine, etc.

The training and orientation of teaching staff receive particular attention in WHO programmes, as the main way of

achieving these objectives. In addition to such widely used methods as studies abroad and advanced training at home under visiting professors, a special advanced training programme has been organized by Harvard School of Public Health with WHO cooperation, for the prospective teachers in preventive medicine coming mainly from Asia, where great interest has been shown in the preventive approach to medicine. However, in most cases the purpose is to train people in conditions similar to those in which they will have to work and, hence, the importance of developing local and regional training institutions.

The educational programme of WHO was and is influenced in its substance and methods by a number of circumstances which can be grouped in four categories of sources:

1. the experiences of other agencies—inter-governmental and non-governmental;

2. requests from the countries for advice and assistance in training;

3. advice from outside consultants, advisory panels, professional groups, etc.

4. results of WHO studies and observations.

Liaison and cooperation are maintained with other agencies and institutions interested in education (UNESCO, International Association of Universities, International Bureau of Education, etc.); in professional training, e.g., the World Medical Association; private Foundations with international interests, bilateral governmental agencies; and many nongovernmental bodies such as international associations in individual specialties.

Subjects of particular interest or of programme importance are submitted to expert committees or study groups who advise the Organization on its technical work. Among the many educational subjects discussed in this way are, for instance, the following: teaching of preventive and community aspects of medicine, teaching of basic sciences, introduction of radiation medicine into the medical curriculum, training of foreign postgraduate students in schools abroad, health education in medical and related curricula, training of auxiliary health workers, and several other subjects. From these meetings a great deal of important information on the matters at issue and on related educational aspects is invariably produced and recorded. Other information comes from consultants, visiting teaching staff, and from government and educational institutions, while professional WHO staff are regularly making relevant studies in various regions of the world. Part of this material is published from time to time, and some is used in current work or awaits later utilization. Some studies and publications may be mentioned just as examples: the World Directory of Medical Schools (with a brief description of medical education in all countries of the world), a similar Directory of Dental Schools, Inventories of Teaching Equipment in Non-Clinical Subjects (with a brief description of current trends in the teaching of these subjects), Bibliography on Medical Education, various publications on the teaching of preventive medicine and public health; studies on medical education in selected countries or regions, studies on pediatric education, etc. Similar studies have been made with regard to training in allied professions such as nursing and sanitation.

From its composition and the congregation in its meetings of persons from so many nations, WHO is in a unique position both for the collection of information and for its assessment free from bias toward any particular educational or cultural pattern. This information, and the opinions and advice

which stem from it, are at the service of all interested countries.

The setting-up of national committees on medical education and the holding of well prepared national conferences have been strongly recommended by WHO to many countries as first steps toward the advancement of their medical education. Several countries in Asia and Latin America have done this with or without WHO cooperation, some with definite positive results. Informal but useful discussions along similar lines have taken place on the occasion of WHO visiting teams of medical scientists, when the presence of professors from several countries, representing various subjects of the curriculum, permitted the review of the country's medical education in the light of the rich and varied experience of the visitors. Such discussions took place, for example, in India, Burma, Ceylon, Indonesia, Israel, Iran, and the Egyptian province of the U.A.R.

Consultations on the establishment of medical education in a country were held in Costa Rica, Tunisia, Ethiopia, Morocco, and cooperation in the early stages of the school's development has taken place in Afghanistan and Cambodia. In many other countries, consultations concerned more advanced stages of strengthening or reforming medical education, or cooperation was concentrated on the promotion of some selected areas of study.

Special action has been taken in the Congo. The Medical School of the Lovanium University in Leopoldville decided to increase their activities in order to meet the new situation. WHO is assisting the school with several visiting professors. Although the shortage of physicians resulting from the rapid departure of many foreigners has been remedied by emergency measures such as Red Cross teams, voluntary teams from several countries, and internationally recruited personnel, the problem of how to provide local medical staff needs still another solution.

A special programme has been organized with the cooperation of several schools of medicine in France, which have agreed to accept for a 3-year course 60 "medical assistants" from the Congo who have had an adequate general educational background, 4 years' training in the very well run Schools for Medical Assistants, and several years of experience in hospital work under proper medical supervision. On the basis of a comparable experience in France with the supplementary training of former "Médecins africains," it is hoped that these Congolese students will be able in 3 years to expand their knowledge to the level of full medical graduates, and return to their country as well qualified physicians in 1963.

To conclude this article, it is suggested that probably never before in human history was there such a world-wide acceptance of the universal, global role of medicine in human progress as we feel it now. In our impatience we rate the pace of progress as slow, the results as still insignificant, but the trend of ideas is nevertheless encouraging.

Medicine, to which the nations look for guidance in their physical, mental, and social development, could not be French medicine, or Indian, or American, or even Greek. It should draw from all appropriate sources and bring all the various elements together into one ever-progressing, world-wide medical heritage common to all humanity. International efforts in medical education aim at the enrichment of this heritage and its transmission to the coming generations of adepts in medicine.

Higher Medical Education in the U.S.S.R.*

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SUMMARIO

Le disveloppamento de education medical in Russia occurreva plus rapidemente que in le altere paises, in particular post le Revolution de 1917. A iste tempore il habeva 17 institutiones medical (pro le major parte departimentos universitari) con 8,000 studentes, durante que 80 scholas con plus de 163,000 studentes opera in 1961. Il ha nunc scholas medical in omne Republicas Soviet, etiam in le regiones anteriormente le plus retardate de Asia central. Per consequente, le ration population/medico ha crescite acutemente, specialmente desde 1940 (ab 7.2 medicos per 10,000 habitantes a 17.9 in 1959). Pro mantener progresso al mesme rata que illo de disveloppamentos economic e scientific, on ha facite cambios structural radical durante le 3 decades passate; iste cambios son describite in detalio. Un progresso le plus importante resultava del decision del governamento soviet de transformar, ab 1925 a 1930, le departimentos medical universitari in institutiones independente appellate *institutos medical*, del qual il ha nunc duo typos principal: pro specialisation in un sphera o pro specialisation in plure spheras (con un schola separate pro cata uno). Le spheras principal son: medicina general, pediatricia, hygiene, stomatologia, e pharmacia. Le curriculo, disveloppate per le Ministerios de Sanitate Public e Education Supere, es uniforme in omne partes del Union Soviet, ma es revidite de tempore in tempore pro accordar con le necessitates del pais. Education medical es gratis in le U.R.S.S., como es tote altere education. Omne citatanos usque 35 annos de etate qui ha complite le obra del schola secundari son eligibile, ma on require que omne sollicitator subi un examine competitive de ingresso. Le duration del curso medical es de 5-6 annos, inglobante 2 annos de studios premedical in theorias e scientias natural. On assigna un posto importante a travalio laboratori, ma on da etiam grande importantia a conferentias "creative." Practica in industria ha essite introducite ab le prime anno, e post le completion del quarte anno, le studentes parti pro practica medical industrial in hospitales regional, sub le guidantia de lor professores. Location de medicos novemente qualificate es compulsori. On do attention special al education postgraduate; cata medico in le nation ha le opportunitate de augmentar su saper e habilitate professional cata 2 o 3 annos per assister a cursos special, de 4 a 6 menses de duration, al institutos de maestramento avantiate pro medicos.

The training of physicians in Russia began somewhat later than in the countries of Western Europe. At the end of the 17th century, by a decree of Peter the Great, hospital schools were organized in Kronstadt, Moscow, and Elizavetgrad, in which the training of medical practitioners was conducted mainly for the safeguarding of the health of military units.

In the middle of the 18th century, with the founding of the university in Moscow and the medical and surgical academy in St. Petersburg, the preparation of certified doctors began in Russia.

The development of higher medical education in Russia occurred at a more rapid rate than in other countries, particularly after the 1917 Revolution. As is well known, up to 1917 there were in Russia seventeen higher medical educational institutions (university departments and advanced courses for women), with 7,000–8,000 students and an annual graduating class of about 1,500 physicians.

The extent of providing medical aid to the country's population appears to be an indirect proof of the level of the well-being of a nation. This may be con-

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firmed by the example of the Soviet Union, which in 1940 had 7.2 physicians for every 10,000 inhabitants; and in 1959 this figure increased to 17.9 units.

In connection with the basic changes in the principles of health protection in our country after the Revolution (a state system of health protection and free medical aid to the population), there was a sharp increase in the demand for physicians and, hence, the need for training them.

In spite of the difficult economic situation of the country during the civil war period, it was during that short period (1918–1922) that sixteen higher medical educational institutions were established.

The greatest number of medical institutes were organized during the period of the successful economic development of the Soviet state—1930 through 1940; during World War II five medical institutes were established, and twelve more after the war. Thus, by 1961 there were, in the U.S.S.R., 80 higher medical educational institutions, with over 163,000 students being trained in them.

The reorganization of public health service, the change in the direction of the training of doctors, as well as a sharp increase in the number of medical students, made imperative the necessity of changing the organizational structure of educational institutions. By Government decision, within the period between 1925 and 1930, the schools of medicine of the universities were reorganized into independent institutions called medical institutes. Thenceforward this became the only type of educational institution, with the exception of the five schools of medicine at the universities of Vilna, Tartu, Uzhgorod, Yakutsk, and Petrozavodsk.

The organization of medical institutes as independent educational institutions justified itself by providing opportunities for increasing the enrollment of students and reorganizing the teaching methods to meet the demands of the practical application of health protection.

Before long, the reorganized schools of medicine were transformed into large educational institutions having from 3,000 to 4,000 students each (Moscow, Leningrad, Kiev, Kharkov, Kazan, Tomsk, Odessa, Lvov). A great number of medical institutes were established in accordance with the state plan in those economic regions in which was anticipated an intensive development of industry, agriculture, and the subsequent population growth.

The economic and cultural growth of the national republics provided a good basis for establishing there medical institutes, in which doctors of local extraction are being trained. At the present time there are medical institutes in all the republics. The formerly backward regions of Central Asia—Uzbekistan and Kazakhstan—now have four medical institutes each. Furthermore, the medical institutes at Tashkent and Alma-Ata are rather large educational institutions, with a student enrollment of over 3,000 in each.

In spite of such vast network of educational institutions, steps are being taken to further increase the turnout of specialists so as to improve the medical service rendered to the population. To this end, in 1953–1958 medical institutes were founded in Blagoveshchensk, Chita, Barnaul (Altai region), Andizhan (Uzbekistan), Aktiubinsk (Kazakhstan), Kemerovo (Western Siberia), Lugansk (Donets industrial region), Ternopol, Rovno, and Vladivostok (1958) (Table 1).

As regards their organizational structure, the medical institutes of the U.S.S.R. may be divided into two types: specializing in one field, and specializing

TABLE 1

A LIST OF MEDICAL, STOMATOLOGICAL, AND PHARMACEUTICAL EDUCATIONAL INSTITUTIONS OF THE U.S.S.R.

MEDICAL INSTITUTES	FOUNDED IN
1. Azerbaidzhan (Baku)	1919
2. Altai	1954
3. Arkhangelsk	1932
4. Andizhan	1955
5. Astrakhan	1918
6. Aktiubinsk	1957
7. Bashkir (Ufa)	1932
8. Blagoveshchensk	1952
9. Vinnitsa	1932
10. Vitebsk	1934
11. Voronezh	1930
12. Vladivostok	1958
13. Gorky	1930
14. Grodno	1958
15. Dagestan (Makhach-Kala)	1932
16. Dnepropetrovsk	1916
17. Erevan	1922
18. Ivanovo	1930
19. Izhevsk	1933
20. Irkutsk	1930
21. Kazan	1930
22. Kazakh (Alma-Ata)	1931
23. Kalinin	1954
24. Karaganda	1950
25. Kaunas	1950
26. Kemerovo	1956
27. Kiev	1841
28. Kirghiz (Frunze)	1939
29. Kishinev	1945
30. Krasnoyarsk	1942
31. Crimean (Simferopol)	1931
32. Kuban (Krasnodar)	1920
33. Kuibyshev	1942
34. Kursk	1935
35. Leningrad Institute I	1897
36. the Leningrad Institute of Hygiene	1907
37. the Leningrad Institute of Pediatrics	1935
38. Lvov	1773
39. Lugansk	1956
40. Minsk	1921
41. Moscow Institute I	1765
42. Moscow Institute II	1906
43. Novosibirsk	1935
44. Odessa	1900
45. Omsk	1920
46. Orenburg	1944
47. Perm	1930
48. Riga	1950
49. Rostov	1930
50. Riazan	1950
51. Samarkand	1930
52. Saratov	1909
53. Sverdlovsk	1931
54. Semipalatinsk	1953
55. Smolensk	1920
56. Stavropol	1938
57. Stalinabad	1939
58. Stalingrad	1935
59. Stalinsk	1930
60. Stanislav	1945
61. Severo-Osetinsky (North Osetian)	1939
62. Tashkent	1919
63. Tbilisi	1918
64. Tomsk	1888
65. Turkmen (Ashkhabad)	1932
66. Ternopol	1957
67. Khabarovsk	1930
68. Kharkov	1805
69. Cheliabinsk	1944
70. Chernovtsy	1944
71. Chita	1953
72. Yaroslavl	1944
MEDICAL STOMATOLOGICAL INSTITUTES	
1. Moscow	1935
2. Kharkov	1821
PHARMACEUTICAL INSTITUTES	
1. Leningrad	1919
2. Perm	1937
3. Zaporozhe	1921
4. Piatigorsk	1943
5. Tashkent	1937
6. Kharkov	1921

in several fields. In the former, students are trained in one field of specialization, and in the latter they are trained in two to five fields of specialization, in separate schools of medical institutes. In the system of medical institutes in the U.S.S.R. there are the following schools: general medicine, pediatrics, hygiene, stomatology, and pharmacy.

In the school of general medicine, preparation of general medical practitioners is conducted; the school of pediatrics trains doctors for children's clinics and dispensaries; the training of public health doctors and epidemologists takes place in the school of hygiene; the school of stomatology trains dentists; pharmacists receive their training in the school of pharmacy.

The majority of the medical institutes have only one school, i.e., they prepare doctors in only one field of specialization; the larger ones have from two to five schools. An average of 250–300 students in each school are being trained every year.

The duration of study in the schools of general medicine, pediatrics, and

hygiene is 6 years; in the schools of stomatology and pharmacy, studies last 5 years.

The growing need for specialists in our country brought about the necessity of organizing evening schools at large medical institutes (from 1958 on), where nurses, medical assistants, and midwives desiring to acquire medical education are being trained. The length of study in the evening schools is 6½ years; for 3 years the students combine work in medical institutions with evening study at the institute, and for the remainder of the time their studies in the evening schools follow the same program as is required of all students—i.e., daytime classes.

In addition to that, for stomatologists and pharmacies there have been organized correspondence courses which enroll dentistry and pharmacy students who have had their secondary specialized education as well as practical experience in this field. Those enrolled in correspondence courses are granted twice a year a 1-month leave with pay to enable them to take their examinations during the scheduled period.

The percentage of each type of student training in the medical institutes depends on the need of the country for physicians in the basic fields of specialization.

At present, the distribution of schools in higher medical education institutions is the following: general medicine, 70; pediatrics, 27; hygiene, 23; stomatology, 17; pharmacy, 10. In addition to that, in our country there are several institutes which prepare specialists in one field only: pediatrics, 1 (Leningrad); hygiene, 1 (Leningrad); stomatology, 2 (Moscow, Kharkov); pharmacy, 6 (Leningrad, Kharkov, Tashkent, Perm, Zaporozhe, Piatigorsk).

The curricula of all the schools and the type of specialist training in them are quite well developed. Recently, however, in connection with the improvement in the standing of prophylactic medicine, the question of the necessity to revise the training of specialists in the school of hygiene became increasingly important. Beginning in 1960, a curriculum was adopted in which considerably more time is devoted to future public health doctors, who now study sanitary and hygienic routines, microbiology and epidemiology, public health supervision in the planning of industrial establishments and of dwellings, communal hygiene, industrial hygiene, and occupational diseases.

Thus, we take the position that the schools of hygiene should prepare specialists in sanitary supervision and prevention of epidemics without the right to practice medicine.

In all the medical institutes of the U.S.S.R., the training of students is conducted in accordance with a single curriculum developed by the Ministry of Public Health and the Ministry of Higher Education.

For the purpose of improving the organization of instructional and scientific work in the medical institutes, it is common practice to hold annual conferences of directors and instructors of medical educational institutions, during which timely problems of teaching, scientific research, and student education are discussed. Along with this, student organizations hold nationwide and local scientific conferences, athletic competitions, and a demonstration of student amateur creative art.

Within the Soviet Union there are such large republics as the Russian Federation and the Ukraine, which have a larger number of higher medical educational institutions than some large European states (the R.S.F.S.R. has 47, and the Ukraine has 16) and have fine traditions in the organization of higher

medical education. The higher medical educational institutions lend considerable assistance to the newly organized institutes in the national republics.

From the standpoint of organizational structure, the institutes are large establishments which come under the state budget and have their own laboratories, clinics, and museums for student use, as well as good libraries, student dormitories, dining halls, and gymnasiums. In the medical institutes there is a well developed activity of student social organizations, which help organize recreational and cultural activities for the students (sports events, amateur art work, etc.), arrange for the students' stay in sanatoriums and rest homes, and also participate in the discussion of the teaching methods in the departments.

In our country, education is free. The state provides funds for the support of the institutes, the construction of classroom buildings, student dormitories, and the payment of scholarships to students. The scholarship amounts to 30 roubles a month and is paid out throughout the year including vacations.

ADMISSION OF STUDENTS

The higher medical educational institutions of the U.S.S.R. accept citizens up to 35 years of age who have completed 10 years of secondary school or have a diploma from a secondary specialized educational institution, regardless of the place of residence.

All applicants for admission to higher medical educational institutions are required to take entrance examinations in the Russian language, physics, chemistry, and one foreign language. Entrance examinations are given in the month of August. The grade of proficiency is determined on the basis of the 5-point system; those who have obtained the highest grades in their examinations are accepted into the institute.

It should be pointed out that in our country there is a great interest among the youth in the medical profession, and that is why in the competitive examinations there are every year three to four candidates for each vacancy. The annual enrollment of students amounts to 27,000.

The eagerness of the young people to take the competitive examination for admission to medical institutes testifies to the great prestige of the medical profession, as well as to great opportunities in our country for young men and women to obtain higher education.

The entrance examinations are administered by committees. After the close of the entrance examinations, the admission committees study the results of the examinations and admit into the institutes only those who have accumulated between 18 and 20 points out of a total of 20. In case of equal results of the entrance examinations, preference in admission to the institute is given to young people who work for industrial establishments or in medical clinics. Those who have obtained good and excellent grades in the entrance examinations are granted scholarships from the very beginning of their studies.

Special preference in admission to the medical institutes is given to medical assistants, midwives, and nurses; they are required to take only three entrance examinations (instead of the four required of the graduates of the secondary schools). The mentioned privileges help attract to the institutes people with good practical background, between 25 and 35 years of age, who will undoubtedly become good doctors in the future. Of the total number of those entering the institutes, men comprise between 50 and 56 per cent. Recently there has been an increase in the number of male applicants for admissions to the medical institutes, although women still comprise

about 70 per cent of the practicing doctors.

CURRICULUM AND METHODS OF TEACHING

One of the main problems in the work of higher educational institutions is the structure of the curriculum and the teaching methods. The organization of the learning process in the higher medical educational institutions of the U.S.S.R. has much in common with the curricula of the schools of medicine in the other countries of the world.

In contrast to some other countries, and particularly Japan, Argentina, and others, we assign an important place to the laboratory work of students. Therefore, lectures in the general time apportionment take up one-third, and two-thirds of instruction time is set aside for laboratory work. Nevertheless, we attach great importance to lectures in the training of students, being of the opinion that lectures should not be a mere repetition of textbooks but the creative work of the lecturer, who discloses the most important general concepts and also achievements in the fields of medicine and biology. Student attendance of lectures and laboratory sessions is obligatory in the higher educational institutions of the U.S.S.R., since regular attendance of courses is the students' civic duty, inasmuch as the state provides them with free education and with scholarships.

The main instructional and scientific subdivisions of the institutes are the departments, which are established in accordance with the number of courses provided for by the curriculum. The number of courses of study in the various schools is not the same: the school of medicine has 32; the school of pediatrics, 37; the school of hygiene, 37; the school of stomatology, 29; and the school of pharmacy has 23.

In large institutes, which have several schools, such departments as normal anatomy, biology, physics, inorganic chemistry, physiology, biochemistry, pathological physiology, are common for all the schools.

In higher medical institutions, the following faculty posts have been established: departmental chairman (a professor), associate professor, assistant professor, instructor (lecturer) in the department. The number of these posts in each department is determined by the number of students enrolled in a given course and the scope of a particular field of study in the curriculum. On the average, the instructor to student ratio in each institute is 1:9 or 1:10. Auxiliary staff is not included in this figure. The filling of the posts of professors and instructors takes place on a competitive basis every 5 years; the selection is made by the Council of the institute through secret balloting.

We shall now consider in greater detail the structure of the educational process in the medical institutes.

The academic year in the higher educational institutions of the U.S.S.R. is divided into two semesters: fall-winter, from September 1 through January 20, and spring semester—from February 7 through June 20. Vacation consists of 2 weeks in the winter and 2 months in the summer (July-August). A student work week (laboratory sessions and lectures) consists of 36 hours. Classes begin between 8 and 9 A.M., with a short recess between lectures and laboratory sessions.

At the close of each semester there is an examination period lasting from 3 to 4 weeks and covering not more than five subjects. On passing from the second to the third year, the students take state examinations in anatomy, histology, biochemistry, and normal physiology. It should be pointed out that the majority of the students pass their ex-

aminations at the appointed time; only between 3 and 4 per cent of the student body for various reasons fail to report during the period scheduled. The number of student failures is negligible.

The concern about improving the training of specialists in higher educational institutions is both an old and at the same time an ever-recurring problem. Should first-year students be familiarized with practical medicine, as is done in France, or should they be given initially the theoretical foundations of biology and medicine and later pass on to clinical subjects? We have adopted the latter solution. In the first 2 years the students are taught subjects which form the theoretical and natural-science basis of medicine: philosophy, physics, chemistry, anatomy and histology, physiology, and biochemistry.

Only from the third year on, purely medical subjects begin to be taught: pharmacology and prescribing, pathological physiology, pathological anatomy, surgery, therapy, roentgenology (x-ray techniques), and microbiology (Table 2).

Apparently also in other countries, as in our own, there is some dissatisfaction with the preparation of students in general practice. Opinions to this effect are being voiced in almost all the countries in the world. This may be explained through the large differentiation of the scientific subjects in the field of medicine and the necessity to master complex methods of diagnosis and treatment. The famous American scientist Dwight O'Hora emphasized in 1955 the need to inculcate in the students, during the process of learning, the skills of a doctor with broad specialized knowledge (who has mastered the most widely used methods of diagnosing and treating the sick). To improve the practical training of students in the medical institutes of the U.S.S.R., practice in industry has been introduced in the first year of studies. In the first and second year, students familiarize themselves with the work of clinics and hospitals and carry out instructions regarding the care of patients; third-year students perform the duties of nurses.

After completing the fourth year, the students leave for industrial medical practice in regional hospitals, where they perform the duties of country doctors. Industrial practice in hospitals for the duration of 1 month is also required of the students upon completion of their fifth year.

For the directing of medical practice in the industry, the institutes send associate or assistant professors to the regional hospitals; the daily tasks of the students, however, are supervised by experienced hospital doctors.

In the fifth year, the medical skills acquired in rural hospitals are supplemented by a theoretical and practical course in hospital clinics. Later on, in the sixth year, the industrial training of the students is broadened through independent work under the conditions existing in city hospitals and dispensaries, under the supervision of departmental lecturers.

The study methods of sixth-year students differ substantially from the studies in the fourth and fifth year. The sixth-year students undergo chiefly practical training in therapy, surgery, obstetrics and gynecology, all in the school of general medicine; in the school of pediatrics, they receive training in pediatrics and the treatment of children's infectious diseases; in the school of hygiene, they receive training in hygiene and epidemiology. Along with the practical training, the fifth-year students are given two lectures a week on the most important problems of clinical medicine and in special subjects for the schools of pediatrics and hygiene.

What is then the difference in the

TABLE 2

CURRICULUM OF THE SCHOOL OF GENERAL MEDICINE IN A MEDICAL INSTITUTE

Qualification of the specialist: physician; Length of study: 6 years.

COURSE NO.	TITLE OF COURSE	DISTRIBUTION BY SEMESTERS		NUMBER OF HOURS	
		Examinations	Assignments	Total	Lectures
1.	History of the Communist Party of the Soviet Union	1, 3	2	150	80
2.	Political Economy	3, 4	....	90	46
3.	Dialectical and Historical Materialism	5, 7	4	140	70
4.	Foreign language, including a course in Latin	2, 11	2, 4, 6, 8, 10	238	....
5.	Physical Education, Physical Therapy, and Medical Supervision	....	1, 2, 3, 4, 10	166	16
6.	Physics	2	1	152	84
7.	Biology	2	....	172	86
8.	Anatomy of Man	3	1, 2	376	102
9.	Histology, incl. Embryology	3	....	182	66
10.	*a*) Inorganic and Analytical Chemistry	1	2	140	54
	b) Biochemistry and Organic Chemistry, Physical and Colloidal Chemistry	2, 4	3	295	131
11.	Physiology	4	....	246	131
12.	Microbiology	5	....	207	70
13.	Pathological Physiology	6	....	155	68
14.	Pharmacology	6	....	170	68
15.	Pathological Anatomy, with a course in dissecting	6	....	192	87
16.	Propaedeutics of Internal Diseases, with courses in roentgenology and radiology (x-ray techniques)	6	9	274	133
17.	General Surgery	6	....	189	87
18.	Operative Surgery, with Topographic Anatomy	7	....	117	33
19.	Hygiene	7	....	162	81
20.	Organization of Public Health, with History of Medicine	9	7	125	51
21.	Specialized Therapy, with courses on tuberculosis	8	....	253	111
22.	Specialized Surgery, with courses in urology	8	....	209	98
23.	Nervous Diseases	9	....	106	44
24.	Skin and Venereal Diseases	9	....	101	44
25.	Obstetrics and Gynecology	8, 10	....	379	83
26.	Ear, Nose, and Throat Diseases	9	....	88	31
27.	Children's Diseases	10	....	166	66
28.	Diseases of the Eye	10	....	80	32
29.	Psychiatry	9	....	90	36
30.	Medical Jurisprudence	10	....	100	34
31.	Hospital Therapy, with a course on tuberculosis	....	....	486	68
32.	Infectious Diseases, with a course in epidemiology	11 or 12	....	214	32
33.	Hospital Surgery, with courses in stomatology, traumatology and orthopedics	....	....	554	102
	Total:			6764	2339

structure of the curricula of the various schools of the medical institutes in our country?

In the first 2 years, the studies are conducted in accordance with identical programs for all the schools, with the exception of the schools of stomatology and pharmacy. The differentiation in the instruction begins in the third year.

The students in the school of pediatrics, beginning with the third year, are given additionally the following courses: the propaedeutics of children's diseases, hospital pediatrics, clinical practice in children's infections, and children's surgery.

The students in the school of hygiene take supplementary courses in hygiene of nutrition, communal hygiene, industrial hygiene, and children's hygiene, whose contents soon become a part of the course in general hygiene in the school of general medicine. The enlargement of the scope of the teaching in special courses in the schools of pediatrics and hygiene is done at the expense of some shortening of the courses in therapy, surgery, neuropathology, and other clinical subjects.

Something should be said about the degree examinations. To obtain a medical degree, a student who has completed the curriculum takes State examinations given by special committees approved by the Ministry of Health.

The students of a medical institute take five state examinations in the following subjects: (*a*) Marxist philosophy, (*b*) internal diseases, (*c*) surgery, (*d*) obstetrics and gynecology, (*e*) hygiene, including problems of public health organization (all of these in the school of general medicine). In the school of pediatrics, almost identical State examinations are given, with the exception of one specialized course—pediatrics with children's infectious diseases.

The students who graduate from the school of hygiene take State examinations in: (*a*) Marxist philosophy, (*b*) internal diseases, (*c*) communal hygiene, (*d*) industrial hygiene, (*e*) epidemiology.

Upon graduating from an institute, in most countries the young specialist himself solves the problem of establishing a practice for himself, since he is being aided by various medical associations as, for instance, in the U. S., Norway, France, and others.

In the Soviet Union, there is compulsory placement of young doctors.

A special commission on the assignment of young specialists offers them a choice of several areas of the country where there is a demand for doctors with the corresponding specialization. Having indicated his choice of location, the doctor receives his assignment. At his assigned place the young specialist should work for 3 years.

The higher medical educational institutions, in practice, have maintained a fine tradition of helping the young doctors in their work. The medical institutes maintain contact with their graduates, help them improve their professional skills in short-term courses, and provide them with literature and arrange for consultations with professors in all cases.

An important problem is the professional advancement of young specialists after graduation from the institutes.

As early as 1895, a special institute for the professional advancement of doctors was founded in St. Petersburg. At present there are in the U.S.S.R. eleven such institutes, in which 16,000 doctors annually improve their qualifications.

Aside from the advanced training institutes, the raising of the professional skills of young specialists takes place in large city hospitals and in the departments of medical institutes. The Ministry of Health annually draws up a

plan for raising the qualifications of doctors, on the basis of requests from local health agencies.

Every doctor in our country has the opportunity to increase his professional skill every 2 or 3 years by attending special courses given in the advanced training institutes for doctors. The length of study in these courses is from 4 to 6 months.

For the duration of his studies in these courses, the doctor is guaranteed his salary, is given a scholarship, and provided with dormitory space.

In addition to the short-term courses, specialization and professional advancement are aided by a well-developed system of clinical internships. For this purpose, the Ministry of Health annually sends to the clinics of the medical institutes between 2,500 and 3,000 young doctors for a period of 2–3 years.

Upon graduation from a clinical internship, the doctors work as hospital interns in large suburban hospitals, or administer specialized departments in regional hospitals.

An important place in the training of scientific workers and specialists is occupied by postgraduate studies. As is well known, medical institutes employ 1,800 professors and instructors. That is why the concern about the training of new scientific and instructional staff occupies a prominent place. The main source of the recruitment of professors and instructors is the postgraduate program. The school of postgraduate studies accepts young doctors, mainly those who have had no less than 3 years of practical experience and have demonstrated interest in scientific research. Only active participants in student scientific circles who have carried out some kind of research are admitted to the postgraduate program immediately upon graduating from the institute. Every year the medical institutes and scientific research institutes admit between 700 and 800 persons to the postgraduate program.

Upon graduation from a 3-year course, the postgraduate student presents a thesis to attain the learned degree of candidate of medical sciences.

The medical institutes of the U.S.S.R. enjoy great autonomy. Along with the administration of the institutes, i.e., the directors and deans of schools, in educational institutions there exist councils of professors which concern themselves with surveying the problems of the teaching methods, with discussing the plans of scientific work of the departments, with the training of the scientific and instructional personnel, educational work among students, and the selection of professors and instructors.

All the higher medical educational institutions, in accordance with their territorial location, are under the jurisdiction of the Ministries of Health of the various Union republics and work according to one set of regulations, one curriculum, and programs approved by the Ministry of Health of the U.S.S.R. and the Ministry of Higher and Secondary Specialized Education of the U.S.S.R. Instruction at most institutes is conducted in the Russian language, with the exception of the national republics, where instruction is conducted in the language of the particular nationality.

The instructors and students closely follow the progressive changes in the organization of the learning process as well as the scientific achievements in other countries, among them the U.S.A. We believe that such an exchange of opinions and teaching experience will favor the improvement in the training of a doctor and the increase of his role in the struggle for the better health of man.

Medical Education—United States

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SUMMARIO

Le volumine rapidemente expendente de avantias scientific, e le responsabilitates allargante de medicina in le societate moderne confronta education medical hodie con multe nove defias pro que le profession debe esser preparate intellectualmente e emotionalmente. Educatores medical debe nunc studiar le problemas de attention medical verosimilante a provenir ab le planos del Governamento Federal pro servicios comprehensive de sanitate, appoio pro recerca medical, etc. Un subjecto pro anxietate es le demanda explosive pro personal maestrate, create per le "explosion de cognoscentia scientific" hodierne, a un tempore quando non solmente education medical ma anque le economia del total pais suffere ab un stock insatis de ingenios a un nivello superior. Al mesme tempore, scholas medical, quamquam admittitemente le clave in le edification de servicios de sanitate satisfactori, recipe solmente 1% del total dispensa pro senitate del nation. Certitude de un augmento considerabile in iste portion se considere essential al stabilisation e al recrutamento de facultates, investigatores e altere personal necessari. In despecto de iste e altere difficultates, progresso considerabile ha essite facite in education medical, specialmente in le qualitate de inseniamento. On vide un deviation gradual quanto al axe principal de instruction subgraduate, lo qual reflecte le nove attitude que reguarda education medical como un processo continue e le curso subgraduate como un unitate, non como un serie de "compartimentos plus o minus a proba del aqua." Altere disveloppamento minus favorabile es le tendentia de alicun scholas medical de devenir institutos de recerca plus tosto que centros de inseniamento. Iste se attribui, al grande extento, a lor carentia de fundos pro un programma, e a le natura tempori de le major parte del appoio pro "recerca garantite." Quanto a instruction clinic, le rolo crescente de hospitales non-universitate es accentuate. Inter le problemas le plus urgente que jace in prospecto es le predicamento de alicun plus parve scholas con ressources limitate; le necessitate de disveloppar "scholas de duo annos" de scientias basic; le plen empleo, pro instruction medical, del facilitates hospitalari e del personal clinic qualificate in certe grande citates, como anque un utilisation plus effective del talentos e del cognoscentia de medicos nunc in practica, lo qual poterea adjutar de annullar le pressura immediate pro grande expansion del facilitates del schola medical e del personal. On vide nitidemente le necessitate de expander le bibliothecas medical; on reguarda lor deficientias como un major debilitate in le programma actual de education medical. Altere plus serie defecto in le schema hodierne de servicios medical es le difficultate que multe medicos juvene trova al termination de lor residentia de esser absorbite in le structura actual de practica medical. Nonobstante, iste hiato se ponta, in parte, per le disveloppamento de varie formas de practica gruppo.

Medical education is the chief source of personnel for the medical services of the country and the research programs in the health sciences. It represents one of the major responsibilities of the nation, ranking in importance with housing, food supply, employment, education, and social security, with each of which it is associated. The breadth and depth of these associations suggest the many phases and obligations which devolve upon this area of professional education.

The undergraduate medical course has come to be recognized in recent decades as an important part of university education and hospital responsibilities. There are a variety of instructional patterns among the different medical schools within the framework of the usual premedical college preparation and the re-

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quired 4 years of professional education, the latter often on a calendar instead of an academic year. The outlines of entrance requirements and courses of study are published in the announcements of each school. Almost all medical graduates take a hospital internship of at least 1 year; a large majority continue their preparation in a residency extending an additional 2–5 years in either a teaching or nonteaching hospital.

Some universities have had excellent medical schools for many years and have given them strong support. A number of schools with university affiliations, however, have not been under academic control and direction, although they may be performing at a high professional and educational level on their own responsibility. This has been possible because of the local leadership in the medical profession which from its earliest organization has been dedicated to the training of future physicians. This was well illustrated by the reform in medical education in this country started by the American Medical Association in 1899 and which culminated in the monumental Flexner Report by the Carnegie Foundation for the Advancement of Teaching in 1910. Growing out of those efforts and the activities of the State Boards of Medical Examiners, the universities, the foundations, the public, and the Association of American Medical Colleges professional education has reached its present level in this country.

Medical education today is confronted with new challenges because of its numerous scientific ramifications and broadening contacts with community problems. It is concerned not only with its teaching problems but with provisions for community medical services required for its instructional programs, research projects, advisory services to public and private agencies, and leadership in a constellation of sciences and skills related to the health and well-being of humanity. Under the conditions of modern life with its frustrations, anxieties, health hazards, and apprehensions, the physician has become a symbol of support and assurance. Man individually and collectively will become increasingly dependent upon medicine as knowledge advances, regardless of how medical services are to be organized, practiced, or financed.

An emphasis on true educational principles in medical training and licensure is modifying the points of view and broadening the concepts of those responsible for medical education, not by more recommendations, surveys, statistics, new and more rigid regulations, further legislation, or manipulation of the curriculum. Rather, the endeavors are to free the standardized, lock-step, uniform training pattern to make more flexible this vital aspect of university and professional education through better technics of learning in order that it may more adequately meet the diversified and changing demands made upon it. This involves concern with the broad socio-economic responsibilities of medicine and the health needs of individuals in a modern society as well as the latest explorations in molecular biology, biochemistry, and electronics. It means also considerable awakening of the faculties to the real educational purposes to be attained. The obligations of medical education are as diversified as the functions it must perform and the objectives it must serve. Its own health and vigor are no greater than the health of the total educational enterprise.

GENERAL CONSIDERATIONS

The advances in the biological and chemical sciences, which are likely to remain the basis for sound medical and health services in the future, and the changes in the forms of medical care

are having a profound impact on the whole structure of professional education. The rapidity with which these changes have developed in recent years is now the dominant factor. It is not possible to prepare students for future practice by exposing them only to the medicine of today except to demonstrate the foundations on which it will be built in the future. The widening responsibilities of medicine in modern society, as well as the ever-expanding volume of scientific advances, have introduced a great many new challenges which the profession must be prepared intellectually and emotionally to meet.

The rapid evolution of medical education in this country from the apprenticeship method of a scattered pioneer society to its present high status as a major university discipline has been phenomenal. Its history explains much of its current strength and some of its inherent weaknesses. The problems of medical care, for example, must be studied by faculties if they are to fulfill their responsibilities for medical instruction. The federal government is embarking on plans in comprehensive health services and medical care in addition to its programs in environmental health, support of medical research, and construction of research-teaching facilities. These efforts are bound to have an impact on medical teaching and services as the amount and variety of governmental financing and direction increase, as there is every indication they will. The parallel development of the economic, political, and educational systems of the country is adding strength to the efforts and making possible many of the accomplishments in the education of physicians and other health personnel, the advances in medical knowledge through many research programs, the recruitment and training of teachers and the improvement in hospital services and medical care. Together they all point to expanding demands in the future for more and better health services for the entire population.

This generation is experiencing a major explosion of scientific knowledge. At the same time the demand for trained personnel is producing another explosion. The greatest handicap the country faces is a chronic undersupply of high level skills, which now represent a bottleneck in the national economy. Many of the current efforts and forces suggest the general direction of future developments in relation to health care, provided that sufficient numbers of competent people can be supplied to achieve the goals sought.

"Health is vital because the capacity of the human to achieve is ultimately the most crucial resource." The responsibility of general education is to build up that capacity through learning; the obligation of the health services is to maintain that capacity. These two fundamental functions of modern society are essential in providing, developing, expanding, and safeguarding human resources. The public is turning to the educational institutions and health professions to propose and guide such programs and to produce the personnel necessary to attain the objectives.

Although medical education is the keystone in the arch of satisfactory health services, it receives only 1 per cent of the total expenditures of the country for such activities despite the essential functions which it performs in the life of the nation. The meager support prevents the employment on a permanent basis of enough staff of the highest quality for research, teaching, and clinical responsibilities. Assurance in this regard is requisite to the stabilization of faculties, practitioners, investigators, and other necessary personnel. To a considerable degree medi-

cal education, which is the only source of physicians, and medical research, which is its catalyst, are largely subject to influences beyond their control, particularly in regard to the recruitment of well qualified staffs and students.

The application of laboratory and quantitative methods to many phases of teaching and research is making remarkable progress. The intensive instruction of all students in the principles of scientific accuracy, observation, and exploration, the development of their inquisitiveness and understanding of the physiological, pathological, chemical, and psychological aspects of sickness and disease have a striking and favorable effect on the level of professional teaching. These developments and the expanding character of the medical sciences have led to specialization and a degree of isolation between subjects. In recent decades there has been a gradual shift of the main axis of undergraduate instruction running through anatomy, pathology, and surgery to biochemistry, physiology, internal medicine, and psychiatry, leaving the technical aspects of surgery and the other specialities to hospital residencies as part of graduate medical education.

It was inevitable and highly desirable that quantitative methods and the scientific attitude be extended into the clinical fields to form the scaffold on which present university clinical departments are constructed. The development of one form or another of university full-time clinical divisions in a number of schools, in addition to the rapid expansion of the medical sciences, explains in considerable degree the great progress through emulation and sound leadership during the past 50 years. The widening fields and complexities of medicine require a better education of doctors, the training of teachers, the conduct of clinical research, and the direction and education of young members of the staffs of both the medical schools and the teaching hospitals.

The role to be played by fees from professional services rendered to private and insured patients is one of the financial problems of the medical schools. The growing inflation adds to the disparity between the financial return to the academic teacher and the opportunities in other areas, particularly those in private practice. Signs have appeared in various places in the country indicating a shift toward greater hospital control and to concessions granted to the professional staffs in view of the difficulties of most universities adequately to maintain their medical school programs or to assume any additional financial obligations. Teaching institutions increasingly are endeavoring to employ full-time clinical teachers and investigators under any reasonable plan satisfactory to the staff members and the school that will strengthen and elevate the quality of instruction, the improvement of patient care, and the level of research.

THE MEDICAL COURSE

The basic course today endeavors to create an environment of learning for well qualified students, with emphasis upon the great untapped reservoirs of knowledge in the underlying basic sciences and upon the responsibilities of physicians in modern society. The common denominator of preparation for all physicians is their ability to seek and organize knowledge, develop critique, discrimination, and judgment, not merely to memorize facts. There is in many instances an undue preoccupation with the schedules of subject matter and hours of classroom work.

The medical course is the beginning of the career of a physician and, with his premedical college preparation, lays

the groundwork for his later and continuous adaptation to the growth of medical science and to shifting community responsibilities. The emphasis in that initial period is primarily on methods and habits of learning by "doing" under supervision, not on "teaching" by the faculty or on periodic rearrangements of the curriculum which have very little to do with true education. It is a focus on "how" rather than on "what" to learn.

The new attitude regards medical education as a graduate discipline requiring integration of the entire learning process. The whole undergraduate medical course is looked upon as a unit, not as a series of independent and more or less watertight compartments. This is a characteristic that distinguishes medical instruction from that in most other divisions of a university.

The objective is to produce upon graduation neither a specialist nor a physician who can render every type of professional care but one who, after a basic hospital period of training, is prepared to begin practice as a well rounded, competent, safe, and conscientious family physician appreciative of the socio-economic and psychological as well as the purely medical needs of the individual, or to go forward into advanced work in a specialized field of clinical medicine. Another feature of the present-day plan is the selection of self-starting, self-directing, and self-propelling students who have a broad cultural background rather than a concentration in the sciences alone and who, under the guidance and supervision of skilled teachers, may secure the elements of a real education which, at the professional level, must always be largely self-education.

Although it is highly important that the purely intellectual talents of the student be developed to the fullest it is also a concern that the qualities of temperament, human sympathy, and insight, which are required for dealing with the manifold human problems of medical care, be emphasized. The physician needs an understanding of, and must be able to treat, the man in his environment as well as his disease. There is a new appreciation of the significance of individual illnesses to the public sector as measured in unemployment, environmental diseases, and welfare demands, as illustrations, not alone in the care and treatment of a single person.

The educational program regards the 4-year medical course as a unit by integrating the basic sciences and clinical disciplines through correlation and combined clinics, joint instruction by several departments, comprehensive examinations, clinical clerkships, seminars, joint staff appointments, and other instructional devices. In many different ways the programs of individual schools emphasize instruction in group, family, and rural medical practice, the vital role of student research as a tool of learning, the place of the basic medical sciences in sound clinical teaching and practice, the importance of the chronic diseases, aging, preventive medicine, rehabilitation, mental and emotional disturbances, the handling of emergencies, and the influences of social and economic factors upon medical care, research, and teaching. In the instruction itself the emphasis is placed increasingly on the longitudinal nature of disease and the changes that occur in the individual throughout his entire life span rather than on the occasional acute illness or episode of disability.

The primary function of the medical school is to create the climate in which well qualified students may acquire the knowledge, habits of study, basic skills, sound attitudes, sense of personal responsibility for patients and under-

standing of the ethical principles that motivate the true physician. It is neither possible nor necessary to cover all subject matter or details in the medical course. Many of the proposals that are claimed currently as reforms are misleading, because they represent changes in organization, scheduling, or rearrangements of the curriculum, sometimes on the assumption that doing something differently is doing it better. Often these endeavors are adaptations of secondary school methods through lectures, demonstrations, and other didactic devices. What is needed most is a reorientation of ideas of what constitutes education. Real progress is being made in many schools by concentration on developing the intellectual power of the student and a sense of responsibility for his own development. The search for value judgments is as vital as the search for new knowledge. It represents a shift from vocational training to personal education and a disciplined intelligence which forms ultimately the basis of real wisdom.

RESEARCH

The advancement of knowledge in the health sciences is an essential function of medical education. The gap between what is known and what is applied is widening and probably will continue to do so. The programs are putting emphasis on the scientific approach to health problems, since many of the challenges require the cooperation of physicists, microbiologists, anthropologists, psychologists, and social scientists as well as biochemists, geneticists, pathologists, and pharmacologists. It is obvious that there is dependence on the team approach to many of the health problems, on which team the physician is only one, but an essential, member.

Some medical schools have become, and others are endeavoring to become, research institutes instead of teaching centers, since the abundant funds for these purposes support staffs, supplies, and assistants often not available from school sources. Appointments, academic advancement, and higher compensation are not infrequently more dependent upon quantitative research productivity than teaching interests. In numerous instances the funds provided for research are diverted to support instruction, thus further unbalancing the program of the institution. Research is a vital obligation of a medical school and should be kept in balance with teaching and patient care. Recent studies show that in a number of instances the amount of money for sponsored research exceeds the total of funds available for the basic operation of the schools. Many others show a ratio of 75 per cent or greater.

The large amounts of money for research emphasize the shortage of facilities in the medical schools and hospitals of the country and focus particularly upon the urgent need of properly qualified individuals to carry forward the investigations. The temporary nature of most of these grants points to the necessity of finding a method of providing stable careers for dedicated individuals that will insure their recruitment and permanent employment. The continuing growth of research support on a temporary basis is leading to the separation, control, direction, and utilization of research personnel from the broad objectives of the educational institutions. This is a matter of growing concern to the medical schools and universities because, in the long run, it will make the over-all program less effective and more costly.

THE HOSPITAL

Usually the university is regarded as having the obligation for the preparation of physicians. Today it can meet only a portion of that duty. A substantial

part of the clinical education of undergraduate medical students is frequently in other than university hospitals. Three-fourths of the 13,032 internships and over one-half of the 31,733 residencies currently approved are in nonuniversity institutions. Although these appointments are primarily for training, the service features often are more prominent than the educational. The number of men and women in the internship and residency phase of present-day over-all medical education and services in both university and nonuniversity hospitals is 5 times the number of graduates each year from the medical schools of the country.

The hospital period of training has many of the merits as well as the deficiencies of any apprenticeship type of training. The modern version of that educational method is well recognized in the clinical clerkship, the laboratory instruction and research assignments of students in the medical course, and in the hospital internship and residency. All these are devices by which the student learns under supervision and are among the strong features of professional education in this country.

The general hospital of the future will be more than at present an educational institution as it becomes structured to meet the health needs of the community, not the demands of internal management alone. It no longer is limited to the treatment of acute illness but increasingly shares in the responsibility of early diagnosis, care of patients with chronic disease, physical and mental rehabilitation and restoration of the handicapped, out-patient services, home care, affiliation with nursing homes, "homestead plans," domiciles for the aged and infirm, vocational rehabilitation, intensive care units, progressive medical care, and other features of complete health services provided for in part through cooperating "satellite" institutions and community agencies. In the future it will be expanded to provide preventive medical services for ambulatory patients and well people, with in-patient beds reserved primarily for the acutely ill and those requiring special diagnostic or treatment facilities and personnel. Out-patient services for follow-up, ambulatory, and home treatment often can obviate the need of in-patient care. The education of hospital interns and residents in such an environment has a definite effect on their attitude and preparation to meet the needs of medical care in the community.

Every hospital and medical school must be concerned with the professional education of nurses, social workers, dentists, technicians of every kind, young attending physicians, and administrators. The growing importance of the nonuniversity hospitals in the field of professional education is being recognized more fully. Fortunately, an increasing number of such institutions now have or are creating modern laboratories and other facilities and professional staffs of excellence, some of them with a nucleus of full-time members, which provide a high quality of instruction to house staffs and practicing physicians and thereby strengthen patient care.

The continued separation of the hospital phases from the university controlled period of education is a challenge of the first magnitude. The integration of the basic medical sciences with other academic disciplines strengthens the ties of these departments with the university. At the same time the growth of subdivisions of science in the clinical divisions and the upward expansion of instruction into graduate programs ties these activities more closely to the hospital. The inability of most universities to finance from their own resources the

expanding research and training activities in teaching hospitals has led to increasing responsibility and control of this part of medical education by the hospitals. There is an urgent need to integrate the university and the hospital phase of the over-all program.

Hospital services and medical care will be modified as prepayment programs grow and expand. This is well illustrated by the present nationwide programs of voluntary prepayment hospital and medical "insurance" for over 70 per cent of the population. The shift in the methods of payment from the individual or family in distress to an organization of well and employed persons, whether voluntary, union-sponsored or governmental, which decides in advance how its funds are to be spent has created a new and powerful force in the operation of hospitals and the conduct of medical practice in this country. Emphasis on the purely financial aspects of these problems may fail to give proper consideration to the quality of services and the qualifications of the personnel who are to conduct these programs. Such developments are certain to have an effect on medical education also.

One of the major considerations in the evolution of health services is the gradual transition from the long established methods of individual, solo private practice of medicine on a fee-for-service basis into plans better adapted to the recent developments in specialization within the profession, the growth of scientific knowledge, the requirements for extensive resources for the modern practice of medicine and the necessity of meeting the high costs of health service through various group and insurance plans which distribute the costs of health services over large groups of the population for long periods of time. These plans are reflected in the numbers of physicians now on salaries. About one-fourth of recent graduates now in practice are in full-time salaried positions, and an equal number are on a part-time salaried basis.

It is not the function of medical education to graduate enough medical students to fill all hospital house officer positions. During the last two decades many hospitals have been approved that do not meet adequate educational standards. Hence, the wide disparity in numbers of "approved" internships and residencies and of medical graduates annually. In this particular situation, the difficulty arises because there are too many "approved" internships and residencies, not too few medical graduates. The number of such residencies has increased 600 per cent in the last two decades, during which time the annual number of medical graduates rose 35 per cent. Many hospitals without well developed instructional programs for interns and residents are being obliged to cover their house staff needs by salaried physicians.

LENGTH OF TRAINING

The question of adequate preparation in a liberal education for the needs of present-day medical education and practice has an important bearing on the length of time required to produce a physician. Telescoping the professional and the undergraduate college courses was a method used for a period in the past and then abandoned. It is now being revived under new circumstances. The introduction of the longer hospital periods of training plus the requirements of military service after graduation have intensified the challenge to reduce the long span of time and the consequent cost of professional education to the student. The most satisfactory solution would be to strengthen, vitalize, and shorten the period of secondary and college education as recommended in recent studies rather than

to curtail or interfere with the medical course proper which is currently being broadened to include certain aspects of the social, biological, and physical sciences. The lengthening of the hospital residency period arises because of the requirements of specialty preparation and of the specialty boards. It is possible that this whole period may become a part of a modified program of medical-hospital services and education in the future which may serve as the mechanism of absorbing recent graduates into the fabric of medical services of the commnuity.

The life-time career of the physician is in one piece; it is a way of life. The premedical college period, the medical course, the hospital internship and the residency, the continuation education of the practitioner, whether family doctor or specialist, the teacher and the investigator are all phases of a life-long dedication. This philosophy of the long-term nature of medical education and its organic relationship to university and secondary education on the one hand and to the society it serves on the other explains in part the continuous efforts of medical faculties to improve teaching methods and procedures.

SOME PROBLEMS AHEAD

Among the current problems is the serious status of some of the smaller medical schools whose limited resources handicap them from making their full contribution to the over-all needs of the country. Many well qualified teachers, investigators, and clinicians have been produced by the larger, well supported schools during the last 2 decades and are available to fill posts in other schools. This was not the situation until recently. Many of these young men and women are eager for challenging opportunities where reasonably adequate support is evident in less well developed institutions. These circumstances indicate a large potential source of expansion for meeting the national needs in the future.

The possibility of developing with necessary safeguards a few schools of basic medical sciences, the so-called "2-year schools," is being considered by several universities. A number of 4-year schools in larger cities can take more students into their third and fourth years than they can accommodate in the first year, because of the bottleneck of laboratory space and instructional staff in that year. They have access to unused clinical facilities for the last 2 years of the course. Some of the large universities without medical schools already have many of the facilities and staff to develop graduate programs in human biology and thereby provide much of the first 2 years of medical instruction, upon completion of which students could transfer to the third year of a full 4-year school or continue as investigators and teachers in the basic medical sciences. In some instances the universities that are considering the possibilities of a school of basic medical sciences have long-term plans for the development of a full 4-year program.

Graduate programs in human biology or the "Life Sciences" would offer opportunities for developing closer ties than now exist between the medical sciences and other major university divisions. They would become a living bridge between the ever-expanding physical, chemical, and social sciences and the phenomenal demands of medical and health services of the nation and the world. The newer concepts of health and medical research and of professional education can benefit greatly from closer association with the disciplines of philosophy, history, physics, sociology, chemistry, psychology, economics, anthropology, and mathematics. Joint investigations and instruction in human

biology at the graduate level would put added emphasis on the development of broadly trained leaders for a new generation of medical teachers and practitioners.

The number of hospital facilities and qualified clinical staffs in certain big cities not now used in medical instruction is an open invitation to develop quickly new resources for medical instruction at reasonable cost and to the benefit of those hospitals, the local communities and the nation. Such developments would be consistent with the upward extension of medical education into the hospital internship and residency programs, now including over 40,000 "graduate" medical students, and into the continuation education of physicians in practice, all of which are part of the whole spectrum of present-day medical education.

An increasing responsibility of medical education in the future will be related to helping prepare physicians for the underdeveloped areas of the world where malnutrition, acute infections, and parasitic diseases as well as poverty and illiteracy are widespread. A number of medical schools have been conducting such programs in collaboration with educational institutions in those countries. They are thereby making contributions of the highest significance to mankind because medical-health services represent a noncontroversial, truly international language. Several foundations have made some of these efforts possible, but much more must be done by the medical schools.

The medical profession, hospitals, and schools need to develop a more effective utilization of the talents and knowledge of physicians now in practice which, if done properly, can offset to a considerable degree the immediate pressure for great expansion of medical school facilities and student enrollments, confronted as they are at this time by inadequate staffs for existing institutions and handicapped by an insufficient supply of well qualified applicants for admission. The more efficient employment of doctors and other health workers would be important, since it appears clear that there will be a shortage of medical services and personnel in the near future. Patterns are being sought in which the profession can wield its expanding power for public service and help solve new problems created by social and economic circumstances. It is well recognized that even present-day knowledge is far in advance of its application or availability to individuals and communities.

A crucial problem confronting the whole program of medical education is that of the recruitment of qualified students. Unless this phase can be solved many of the other questions are academic. Today students in medicine have very high expenses, usually met by their families, a long period of intensive professional education and training, including the hospital internship and residency, and little time or opportunity because of their heavy schedules to support themselves. Even the most determined of medical students are at a great financial handicap in comparison with other graduate students many of whom have fellowships or other support. This particular disadvantage can be corrected by substantial scholarship and loan funds for medical students which now are becoming available from a number of sources.

An adverse factor in attracting high-quality professional students is the reduction in the previously favored choice of medicine as a career. It is no longer the first choice of as large a proportion of students well prepared in biology, physics, mathematics, and chemistry as was the situation in the past. Many industries are offering favorable oppor-

tunities, security, and good financial attractions to young men and women with the background most needed also for medicine and the health professions. There are growing opportunities in the social sciences, business, and other fields with which medicine, in a sense, is in competition for students. This situation is likely to continue in the next decade even when large numbers of college graduates become available. The supply of medical students in the future will depend quite as much upon the challenges which medicine will offer in science, graduate education, clinical opportunities, and public service as upon scholarships or other financial aid. Strengthening career opportunities will be the greatest single incentive in the recruitment of medical students.

There is a clear need for expanding medical libraries, particularly in the smaller schools. Adequate library facilities are as essential to medical instruction as laboratories and clinics. A major weakness in the educational program is the lack of such resources.

Probably one of the most important weaknesses in the whole scheme of medical services today is the waste of talent and competence at the end of the hospital residency when many young men and women in that stage of development cannot readily be absorbed into the present structure of medical practice. Under existing conditions there is no well established bridge from the residency to practice. This gap is being solved in part through the slow development of various forms of group practice and salaried medical services, often in hospitals. This is a significant area of the over-all medical problem, because a large majority of the young men and women now in the hospital residencies desire to remain in full-time teaching or research or some type of full-time medical service after completion of their clinical preparation. They are available to enter community health services under satisfactory circumstances.

The future health needs of the country, based not on predictions but on known facts, will not be met by mass education or the vocational training of large numbers of inadequately prepared doctors. They will be met by the intensive preparation of leaders in the clinical and basic sciences, teaching, research, and practice which emphasizes high excellence and competence. The indications are that American medical education in the future will deepen and broaden the basic medical sciences in the matrix of the university disciplines, widen the instruction of students and hospital residents in the socio-economic problems of adequate health services, and extend the responsibilities of clinical medicine and instruction upward through hospital and community professional services for the benefit of the country and the world.

Medical Education in Latin America

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Pan American Sanitary Bureau, Regional Office of WHO

SUMMARIO

Le influentias traditional in America latin esseva espaniol in su principios e, plus tarde, francese pro le major parte (anglese in alicun paises). Super iste nucleo alicun lineamentos del systemas in le Statos Unite de America se transplanta al presente. America latin, confrontate con le rata le plus elevate de augmento del mundo in population, un rata elevate de mortalitate infantile e un serie de major problemas de salubritate, ha un ration medico/population multo infra su necessitates. Ergo on ha date attention special al progresso de education medical in America latin. Le doctor Villareal, un membro del Bureau Sanitari Panamerican de OSM (WOH in anglese) qui esseva antea decano al Universitate Medical San Luis Potosi in Mexico, describe brevemente alicun disveloppamentos in tres areas de major importantia: facultate, corpore de studentes, e organisation del curriculo. Educatores de America latin recognosce como uno del problemas le plus urgente es de fornir a le scholas medical un numero adequate de membros facultate ben qualificate al tres functiones de un schola medical que son inseniamento, recerca e servicio—*super un base plen-tempore*. On ha exprimite iste conceptos in plure conventiones medical de America latin, e on reporta progresso considerabile in iste respecto. A causa del augmento rapide in population, e como un resultato del reformas social in progresso in multe paises, le population studente crece rapidemente, dum le scholas medical son non-preparate e equipate inadequatemente pro absorber le grande numero de studentes que elige le carriera medical. Altere problema es le alte proportion de studentes que falle de finir lor studios (50% in multe instantias). Le major parte de educatores medical son de accordo que iste proportion elevate de fallimentos es causate principalmente al manca de un systema selective de admission, e plure scholas disveloppa nunc proceduras selective. Le reorganisation de programmas de inseniamento es altere affaire de anxietate. Le longor de studios medical in paises de America latin varia ab 5 a 7 annos, e usualmente on non require un periodo stricte in internato. Recentemente, nonobstante, plure scholas ha introducite reformas de curriculo que dedica le ultime anno del curso medical exclusivemente al practica hospitalari, e alicun paises ha establite, como un requirimento de graduation, practica medical in un area rural durante un periodo de 6 a 12 menses. Plure reuniones ha habite loco recentemente in varie paises de America latin in le qual on ha analysate le contento e organisation del curriculo, con emphase special super le numero de homines del que on ha necessitate pro sanitate, medicina preventive, pediatricia, e inseniamento de scientia basic e clinic.

According to the United Nations nomenclature the Western Hemisphere is divided into three regions: Northern America, including United States and Canada; Middle America, which includes Mexico, Central America, Panama, and the Caribbean area; and South America. The term "Latin America" is usually applied to the countries of Middle and South America, taking into consideration cultural, social, and economic conditions. It includes twenty republics as well as certain possessions of the United Kingdom, the Netherlands, and Surinam, and three departments of France. Despite present-day similarity in language—in eighteen countries Spanish is spoken, in one Portuguese, and in one French—there are wide differences in ethnic stock.

The population of Latin America is growing rapidly, averaging in several countries over 3 per cent per year in the

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last decade. This compares with 1.6 per cent for the world and 1.8 per cent for the United States. Latin America has the highest rate of natural increase in the world. In mid-1960 the population of Latin America reached 206 million, whereas United States and Canada combined had 197 million. United Nations projections indicate that by 1980 Latin America will have 349 million people compared with 254 million for her two northern neighbors. By the end of the century Latin America will have almost twice as many people—592 million compared with 312 million for the United States and Canada.

Size of population varies all the way from two countries with population of approximately 1 million to one with over 60 million inhabitants. Another characteristic of Latin America is that its population is relatively young; over 40 per cent of the population is under 15 years of age, as contrasted with 27 per cent in the United States and Canada.

Death rates in Latin America are high, and major health problems are those of infectious diseases, malnutrition, and environmental sanitation. Mortality is excessive in infancy and childhood; 42 per cent of all deaths occur in children less than 5 years of age, which can be contrasted with the situation in the United States where 8 per cent of the deaths in 1956 were in this age group. It is, however, in early childhood (1–4 years) that the greatest differences are encountered. Mortality in this age group is many times greater, ranging from 4 to 35 times the rate of 1.1 per 1,000 population for the United States.

It is considered that the number of physicians available in Latin America is insufficient for the needs. While in 1957 Northern America had 12.9 physicians per 10,000 population, in Middle America the number of physicians was less than 2 per 10,000 in four countries and less than 4 in eight. In five of the countries in South America the number of physicians varied from 2.6 to 4.1 per 10,000, whereas in the other five there were 5.2 to 12.8 per 10,000 (Chart 1).

To understand the problem of medical education in Latin America we must know some of its historical background and its long and rich tradition.

Medical education in Latin America began shortly after the discovery of America. The first chair of medicine was established in Mexico in 1580, and even before that some teaching of medicine was done at the Universidad de Santo Tomas in Santo Domingo since 1558, and in Mexico in the two schools for Indians organized by Bishop Zumarraga and Pedro de Gante (1).

Therefore, traditionally the influences in Latin American medical education in its beginning were Spanish. When professional conditions became more stabilized in Latin America in the first part of the 19th century a number of outstanding men, after going abroad, introduced into their own countries new medical advances and teaching methods. At that time France was the focus of attention in the medical scientific world, and therefore a definite French influence characterized the medical education programs and methodology in Latin America. This influence is still present in many of the programs of the majority of the Latin American institutions. In some countries other influences, especially British, are manifest. Upon this basic core some institutions are at the present time adapting some of the characteristics of the educational systems of the United States.

At the present time there are 88 medical schools in Latin America. Not less than 27 were founded in the 19th century. Actually, every country in Latin America has a medical school (Chart 2). The size of the student body in these

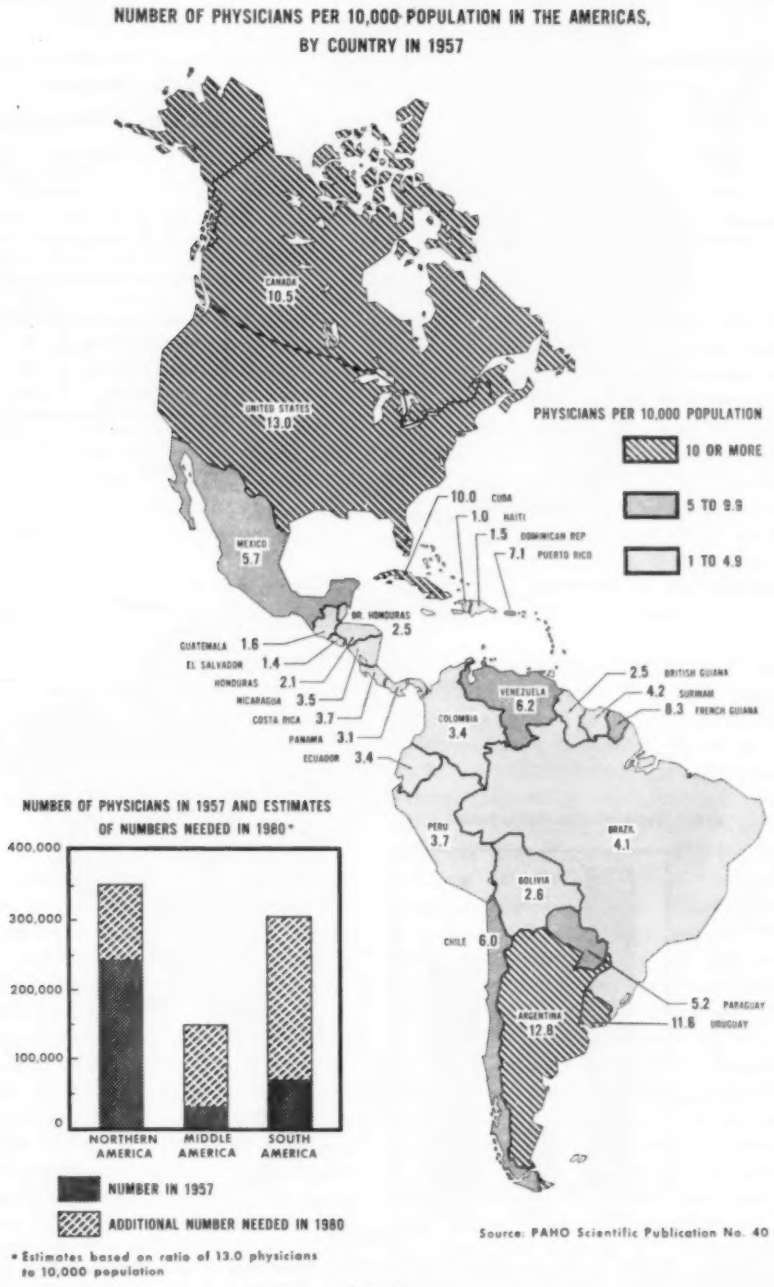
NUMBER OF PHYSICIANS PER 10,000 POPULATION IN THE AMERICAS, BY COUNTRY IN 1957
PHYSICIANS PER 10,000 POPULATION
10 OR MORE
5 TO 9.9
1 TO 4.9
CANADA 10.5
UNITED STATES 13.0
MEXICO 5.7
10.0 CUBA
1.0 HAITI
1.5 DOMINICAN REP
7.1 PUERTO RICO
BR. HONDURAS 2.5
GUATEMALA 1.6
EL SALVADOR 1.4
HONDURAS 2.1
NICARAGUA 3.5
COSTA RICA 3.7
PANAMA 3.1
ECUADOR 3.4
VENEZUELA 6.2
COLOMBIA 3.4
2.5 BRITISH GUIANA
4.2 SURINAM
8.3 FRENCH GUIANA
PERU 3.7
BRAZIL 4.1
BOLIVIA 2.6
CHILE 6.0
ARGENTINA 12.9
5.2 PARAGUAY
11.6 URUGUAY
NUMBER OF PHYSICIANS IN 1957 AND ESTIMATES OF NUMBERS NEEDED IN 1980*
400,000
300,000
200,000
100,000
0
NORTHERN AMERICA
MIDDLE AMERICA
SOUTH AMERICA
NUMBER IN 1957
ADDITIONAL NUMBER NEEDED IN 1980
* Estimates based on ratio of 13.0 physicians to 10,000 population
Source: PAHO Scientific Publication No. 40

CHART 1

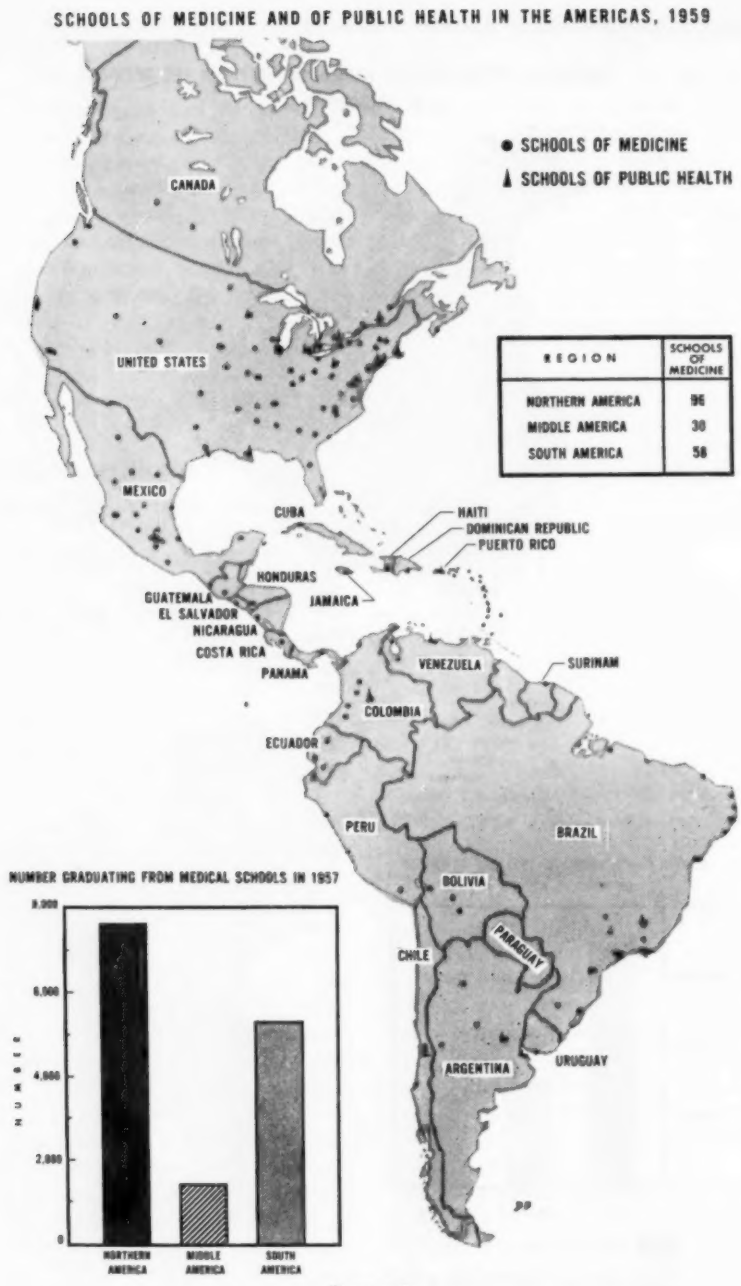

CHART 2

Source: Health in the Americas and the Pan American Health Organization Report of Committee on Government Operations U. S. Senate and its Subcommittee on Reorganization and International Organizations. May 9, 1960.

TABLE 1

NUMBER OF PHYSICIANS AND MEDICAL SCHOOLS IN 1957 AND ESTIMATED NEEDS IN 1980*

REGION	PHYSICIANS 1957 Number	Per 10,000	Estimated need 1980	MEDICAL SCHOOLS 1957 Number of schools	Number of graduates 1957
Northern America	242,400	12.9	351.000	96	7,662
Middle America	30,455	5.0	149,500	30	1,414
South America	69,914	5.3	304,200	58	5,308

* Source: Health in the Americas and the Pan American Health Organization. Report of the Committee on Government Operations U.S. Senate and its Subcommittee on Reorganization and International Organizations.

schools is so variable, however, that the number cannot be examined by itself. The number of graduates has been increasing; in 1944 it was considered that the number of graduates was about 3,000 (1); in 1957 this number was estimated to be 6,722 (Table 1). This increase is not in relation with the increase in population and with the increasing demand for physicians services.

It would be difficult on this occasion, with the limited space available, to describe in detail the different aspects of the great advances that medical education is making in Latin America. A brief description will be made of some recent developments in three areas of major importance: faculty, student body, and curriculum organization.

FACULTY

As medical education has grown more complex the manpower needs of a medical school have increased at a faster rate. It has become obvious that the teaching of medicine requires concentrated attention and more time devoted to organizing the teaching program; keeping up to date with new advances in the medical as well as in other sciences; doing research; performing service. The need for a faculty body that dedicates its entire professional time to the medical school activities is evident. In Latin America this practice is not frequent yet, although the situation is changing rapidly.

In a survey made in 1956 by the Pan American Sanitary Bureau on the teaching of pediatrics in Latin America (5) it was found that, of the 294 members of pediatric faculty of the 86 Latin American medical schools studied, only 1.7 per cent dedicated to the medical school the time that was considered equivalent to a full-time position (1,600 hours per year). This figure may be considered a reflection of the situation in other clinical departments at that time.

In relation to the teaching of basic sciences the situation is a little better, and fortunately it is improving rapidly. However, there is still much to be desired. In 1957 the Pan American Sanitary Bureau with the collaboration of the Latin American Association of Physiological Sciences made a study on the teaching of these subjects in Latin America. The information collected from 48 schools that responded to a questionnaire on the subject showed that only 21.9 per cent of the faculty members dedicated their entire professional time to the medical school (Table 2) (2).

Latin American medical educators recognize the need to continue improving this situation. Perhaps the most pressing problem that the medical schools in Latin America face is how to secure an adequate number of well qualified faculty members who dedicate their efforts on a full-time basis to the three fundamental functions of a medical school;

TABLE 2

DISTRIBUTION OF 1,741 BASIC SCIENCES MEMBERS, ACCORDING TO HOURS DEDICATED TO MEDICAL SCHOOL, IN 48 MEDICAL SCHOOLS IN LATIN AMERICA, IN 1957 (2)

HOURS DEDICATED TO SCHOOL	FACULTY	
	Number	Per cent
Total	1,741	100.0
Full-time	382	21.9
Part-time: 3–5 hours per day	579	33.3
Less than 3-hours per day	723	41.5
Unknown	57	3.3

research, teaching, and service. How much time should they dedicate to each of these functions will vary in each department of the schools, in each institution, and in each country, depending on its own particular problems and resources. What is considered necessary is to have in every school a core of individuals who are developing harmoniously these three functions which provide an atmosphere which will foster the true scientific outlook and a spirit of initiative to inspire in the faculty, as well as all persons who undergo training (undergraduate or postgraduate), the loftiest ideals of the profession; and to promote in them a community outlook, a high degree of culture, and a better attitude of mind in whatever field they may be called upon to serve, whether it be teaching, research, general health work, or administration.

These concepts have been expressed in various Latin American reunions such as the First Pan American Congress on Medical Education held in Lima, Peru, in 1951; the Seminars on the Teaching of Preventive Medicine that took place in Chile in 1955 and in Mexico in 1956; the First Conference of Latin American Faculties of Medicine held in Mexico in 1957 and more recently at the meeting of the UNESCO Center for Scientific Cooperation for Latin America held in Caracas, Venezuela, in October, 1960.

STUDENTS

Traditionally in the Universities of Latin America the student who has successfully finished a period of secondary studies (bachillerato), which varies from 5 to 6 years, is automatically entitled to be admitted to medical school. On the other hand, traditionally too, university education in Latin America is practically free.

Because of the rapid increase in population and as a result of the social reforms in progress in many countries, a greater number of persons is fortunate to receive primary and secondary education. Consequently, the number of students seeking university education is of a very large proportion. To give an example, the population of the National University of Mexico increased from 8,154 students in 1929 to 50,795 in 1959 (3).

This situation has created a very serious problem to medical educators who are willing to adapt modern methods of teaching which require more individual attention of the student as well as more laboratory and clinical facilities; and they are not prepared with the human and material resources to accept an ever increasing number of students willing to study medicine.

Another characteristic of many Latin American medical schools is the high proportion of students who fail to finish medical studies. Many students leave the medical school within the first year or two, frequently after they have failed a usually rather strict examination in Anatomy. The number of students who do not finish the medical career in many instances reaches the proportion of 50 per cent and even more. This system of "natural selection" is inadequate and involves waste of time for the student that fails, waste of time and effort for the faculty, and consequently represents a financial loss for the medi-

cal schools. Medical educators agree that this high proportion of failures is due to the lack of selection of the students who are admitted to the medical school which is the usual practice in Latin America. Several schools, however, are developing selection procedures; in some institutions this selection is based on a premedical year under the responsibility of the medical school; in some others a satisfactory academic standing plus an interview by a special admissions committee and an aptitude test is the practice. An interesting analysis of the results obtained in a 6-year experience (1952–1958) on these matters at the University of Chile has been recently published (4).

CURRICULUM ORGANIZATION

Reorganization of teaching programs is a matter of great concern to many Latin American medical educators: how to use better the available time for an ever increasing amount of knowledge in the medical field.

The length of medical studies in Latin America varies from 5 to 7 years. There is usually no internship period in the sense that is known in the United States, and the physician can start practicing right after graduation. Recently several medical schools, by rearrangement of the course content, are dedicating the last year of the medical career to hospital practice exclusively, under the school responsibility. Some countries like Mexico, El Salvador and Colombia, have established as a requirement for graduation the medical practice in a rural area during 6–12 months.

Several meetings to analyze the problem of curriculum content and organization have been held recently in various Latin American countries.

A Seminar on Pediatric Education was held in Paipa, Colombia, in November, 1958. Medical educators and pediatricians from Colombia and Venezuela discussed the teaching of pediatrics and drew conclusions as how to better prepare professionals in this field which is of basic importance to the health programs of these countries.

The second meeting of the Latin American Association of Physiological Sciences was held in Buenos Aires, Argentina, in 1959. Important matters were discussed, such as the content of the basic sciences programs, the need to prepare more faculty personnel for the teaching of these subjects, and the strengthening of research activities in the medical schools.

The Colombian Association of Medical Schools had its third meeting in Manizales, Colombia, in December, 1959. The topic for discussion was the clinical teaching. Representatives of the seven Colombian medical schools were present at this meeting and also, with the cooperation of the Pan American Sanitary Bureau and the W. K. Kellogg Foundation, medical educators from eight Latin American countries were able to participate. Staff members of the Kellogg Foundation, Rockefeller Foundation, Pan American Sanitary Bureau, International Cooperation Administration of the United States and Tulane University also participated in this meeting. After 1 week of fruitful discussions, interesting recommendations were made regarding important aspects of clinical teaching such as the convenience of emphasizing bedside teaching, integration of preventive medicine concepts along the entire period of clinical training, and the importance of a hospital internship period before the student graduates and as part of the medical education program under the responsibility of the medical school.

In August, 1960, a meeting was held in Merida, Venezuela, to discuss medical education in that country and to plan jointly, with medical educators and pub-

lic health authorities, how to approach the problem of the health manpower needs. The meeting was sponsored by the government of Venezuela and had the technical assistance of the Pan American Sanitary Bureau. It was attended by faculty members of the four Venezuelan medical schools and members of the planning committee for a new medical school that is intended to be established in the east part of Venezuela. Officers of the Ministry of Health and of the Venezuelan Medical Federation were also present.

In Mexico there is a continuous interest in introducing preventive medicine and public health concepts in the medical curriculum. Beginning in 1959 the Ministry of Health has sponsored three national seminars for discussing the need to expose the medical student to various principles of public health as early as possible in his medical career. The topics for discussion at these meetings have been the teaching of statistics, environmental sanitation, and health education in the medical schools.

Finally, we may say that Latin American medical education is facing a big challenge. The people of Latin America are demanding more and better medical care. Modern communications and the large movement of population to areas surrounding the big urban centers as a result of a rapid industrialization, at the same time that they have created great public health problems, have made aware an increasingly larger mass of citizens that good medical care can cure and that they are entitled to good medical care. On the other hand, the responsible governments of Latin America attentive to this growing demand and conscious of the economic gain that good health represents, are developing large social welfare programs in which medical care and prevention of disease are of prime importance. However, the health authorities soon realize that in many cases the basic element around which their programs would develop—the physician—is not available in the required number and in some cases of the desired caliber.

Latin American medical educators have accepted this challenge and are willing to share with their efforts in the progress of Latin America.

ACKNOWLEDGMENTS

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Some of the data presented and additional information on health conditions in the Americas appear in the U.S. Senate Subcommittee print "Health in the Americas and the Pan American Health Organization," 1960.

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Latin American Conferences on Medical Education

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SUMMARIO

Un serie de meetings national e international, sustenite in le decennio passate, e devotate exclusivemente al problemas de education medical, son considerate como factores stimulante importante in le interesse crescente in iste affaires in America latin. Le impacto del Prime Conferentia Mundial super Education Medical (in London, 1953) esseva particularmente forte super un numero considerabile de participantes ab paises de America latin. Adjuta financiari per le Fundation Rockefeller e le Fundation Kellogg lo faceva possibile que on comenciava de complir le planas de reforma que esseva adoptate durantes plure reuniones super maestramento medical sustenite desde 1955. Le Union de Universitates de America latin recognosceva le fermento disveloppante in education medical e patronisave le Prime Conferentia de Facultates de Medicina de America latin in 1957 (in le Citate de Mexico) al qual delegatos ab 37 scholas medical assisteva. Ex iste conferentia veniva le "Declaration de Mexico," considerate le *Magne Carta* de education medical de America latin. Iste Declaration affirmava le importantia de placar le scholas medical sub le egide de universitates; un large education liberal in scientias e humanitates esseva urgite in preferentia a un preparation limitate technic pro practica. On proponiva como un componente essential del programma educational de guidar le studente in le comprehension de homine in relation a su societate e milieu. Coordination de varie partes del curriculo con medicina clinic se considereva mandatari. Le necessitate de un nucleo de facultate a plen-tempore esseva recognoscite etiam, e un internato obligatori de 12 menses ante graduation esseva recommendate. Duo forte stands al Conferentia, pro e contra systemas selective de admission resultava in un compromisso que urgeva que le scholas restringe le numero de studentes a lor capacitate de inseniamento adequate. Cooperation e intercambio inter facultates de scholas medical esseva recommendate fortemente. Un secunde Conferentia, sustenite in Montevideo in decembre, 1960, al qual representationes ab 36 scholas medical assisteva, tractava del topicos principal sequente: Inseniamento e Maestramento graduate in le scientias basic; organisation de centros maestrante pro recerca e inseniamento, e le establimento de un centro de coordination pro scholas medical de America latin. Representatives ab le Association Medical Mundial, le Confederation de Medicina Pan American, le Fundation Rockefeller, e le AAMC (le Association American de Scholas Medical) participava como delegatos invitate.

The affairs of the medical school and the process by which it educates medical students have attracted increasing interest in Latin America during the past decade. This interest may partly be due to the influence of several national and international meetings devoted entirely to problems of medical education during this period. In 1951 a Pan American Congress on Medical Education was organized as part of the celebrations for the Quadricentennial of the Universidad Mayor de San Marcos de Lima, Peru (5). Between 1952 and 1954 several conferences were held at the University of Chile Faculty of Medicine to discuss medical teaching and the ways and means to improve it and raise its standards.

This interest is also due in part to the impact of the First World Conference on Medical Education held in London in 1953 on the considerable number of participants from Latin America. The ideas, viewpoints, and enthusiasm

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for critical reappraisal of the educational process brought back by the delegates spread among colleagues on the faculty with whom they shared their experiences. Changes found in medical education after World War II must have excited faculty members from Latin America studying or traveling in the United States.

The frank statements made by a committee on medical school deans from the United States after a survey of medical education in Colombia in 1954 substantiated the concern of many about the extent to which their educational programs had kept pace with the new concepts of medical education and the rapidly expanding knowledge in medicine and the medical sciences.

Seminars on Preventive Medicine held in 1955 and 1956 in Chile and Mexico under the sponsorship of the Pan American Sanitary Bureau brought into sharp focus new concepts in teaching clinical medicine, with emphasis on maintenance of health and the prevention of disease. Participants recognized the importance of this approach in medicine for Latin America and brought influence on their medical faculties to give the medical student this orientation.

At this critical period, the Rockefeller Foundation changed its policies to permit support of efforts to improve medical education. The financial assistance and encouragement provided by the Rockefeller and Kellogg Foundations made it possible to begin implementing plans and hopes that were emerging from new interest in educational programs for medicine.

In August, 1956, the Central American Medical Faculties organized a 2-day symposium on medical education in Nicaragua (3) to consider the impact of modern developments in medicine and the medical sciences on the educational program for physicians. Professor B. A. Houssay and the late Dr. E. Braun-Menendez, under the sponsorship of the "Sociedad de Biologia de Montevideo," arranged for a discussion of the content and methods for teaching the basic sciences at the meeting of the Latin American Association of Physiological Sciences (ALACF) in Montevideo in April, 1957 (7). Later that year the Argentinian Medical Association sponsored the First Congress on Medical Education for medical faculties in the country (4). One of the important conclusions of this Congress, in view of the practices in force in Argentina, was the recommendation that students be selected for admission to medical schools. Under the leadership of Gabriel Velasquez-Palau, Jorge Vergara, and Santiago Rengifo Salcedo, annual meetings on specific topics in medical education were held in Colombia beginning in 1955. In 1959 an association of medical colleges was organized in Colombia to provide a forum for continued discussions and the mechanism for unifying approaches toward improvement of medical education in the medical schools of the country (2).

The Union of Latin American Universities recognized the developing ferment in medical education and sponsored the First Conference of Latin American Faculties of Medicine in 1957. The Conference was organized by the Faculty of Medicine of the National University of Mexico with the aid of the Executive Secretary of the Union. The response of the medical schools was excellent, and 37 sent delegations to the 5-day meeting. Out of the spirited and often heated discussions in the round table workshops and plenary sessions came the "Declaration of Mexico." This first statement of guiding policies was the "Magna Carta" of Latin American medical education.

The Declaration affirmed the importance of having medical schools under

the aegis and influence of the universities. The role of the medical school in preparing physicians, academicians, and investigators was recognized. A broad and liberal education in the sciences and humanities was urged over a narrow technical preparation for practice. The development of scholarly attitudes, ability to think, and critical judgment were considered more important than acquisition of facts. Guiding the student to understand man in relationship with his society and environment was proposed as an essential component of the educational program.

Coordination of the various parts of the curriculum, especially the basic sciences, with clinical medicine was considered mandatory. The statement on coordination of the curriculum was aimed at the practice in some schools permitting "free professors" to organize courses without reference to other parts of the curriculum. This had origins in South America at the University of Cordoba, Faculty of Medicine (Argentina), in 1918, when a group of young physicians supported by the students challenged the absolute authority of the "titular professors" and demanded that the University permit them to organize parallel courses for students as "free professors." Because of the strong pressure exerted by students and alumni, the University acceded to the demands. The students were permitted choices between courses given by the "titular professors" and the "free professors." This innovation spread to other Latin American medical schools, and the practice of independent action in establishing courses still continues in many.

An obligatory internship of 12 months' duration before granting the professional degree was recommended in the Declaration. This is important, because in many schools the system of instruction gives little responsibility for patient care to the medical student in his clinical courses. Evaluation of the student during his entire program by the faculty rather than by a single final examination was strongly urged.

The importance of a core of full-time faculty members in the basic science and clinical departments, with adequate remuneration to permit devoting their undivided time to teaching and research, was recognized. Research was considered an important activity of the faculty not only for adding to our knowledge in medicine and the medical sciences but also for the continuing development of the teacher.

Two strong positions were taken at the Conference on the selective admission of students to medical school. One group held the opinion that any student who completed secondary school should be permitted to enroll in medical school regardless of numbers involved. The other group maintained that selection must be used to limit enrollment to the capacity of the faculty and facilities for providing an adequate and meaningful education. Although the Medical Schools of the University of São Paulo and the University of Chile have had a limited enrollment and have selected applicants for over a one-quarter century, many schools still exercise little control over the size of their entering classes. This situation prevails mainly in medical schools where students have a strong voice in the executive council. The practice of giving students a voting membership in the body responsible for establishing policies and exercising control over the operation of the medical school can also be traced to the "postulates of Cordoba." At the time "free professors" were permitted to organize courses, the students and alumni were given places on the executive council. This situation now exists in about one-half dozen Latin American medical schools, and in some

the council membership is divided equally among students, alumni, and faculty, giving the latter little control over the affairs of their school.

The statement on selection in the Declaration was a compromise, but a first step toward acceptance of the concept of selection and limitation of enrollment. It urged that schools restrict the number of students to the capacity for adequate teaching. It did not expand the statement to provide guide lines for deciding how many students can properly be accommodated. The practice of permitting students to attend medical school part-time while engaged in unrelated activities was decried.

The medical faculty was considered to have a responsibility in giving graduate instruction and participating in residency training. The desirability of having psychoanalytic training and psychological clinics closely related with the medical school was noted.

Cooperation and interchange between medical school faculties were recommended through the media of travel funds, interchange of faculty members, and establishment of training centers at medical schools having outstanding faculty members and facilities in one or more areas of medicine or the medical sciences.

The final recommendation of the Declaration was for the creation of national associations of medical school faculties and cooperation between them in approaching the problems of medical education.

The invitation of the Faculty of Medicine of the National University of Uruguay to organize the second meeting was accepted, and the date was set for 1959. For a number of reasons the Second Conference could not be held in Montevideo until December, 1960.

The Declaration of Mexico was given wide distribution through publication of the text in *Ciencias e Investigacion* in 1958 (1). Although its impact was not immediate, faculties were stimulated to hold meetings to discuss the statements and recommendations made. Schools not represented at the meeting invited participants in the Conference to interpret the Declaration. Topics on medical education began to appear in discussions at scientific congresses.

The Organizing Committee for the Second Conference was appointed by the Faculty of Medicine in Montevideo. Dr. Juan J. Crottogini, the Dean, was named president. Dr. Washington Buno, Dr. Roberto Caldeyro-Barcia, and a student, Juan A. Roig, were appointed secretaries. Dr. Buno assumed the major administrative responsibility for arranging the meeting.

Topics for discussion at the Second Conference were proposed by the Organizing Committee and additions made from suggestions received from Latin American medical schools. Six main topics were included in the final program: teaching the basic sciences, graduate training in the basic sciences, organization of training centers for research and teaching; establishment of a coordination center for Latin American medical schools, reconsideration of the "Declaration of Mexico."

Thirty-six medical school faculties were represented by delegations at the Second Conference. Table 1 gives the number of medical schools sending delegates from each country.

Representatives from the World Medical Association, Pan American Confederation of Medicine, the Rockefeller Foundation, and the Association of American Medical Colleges also participated as invited delegates.

The meeting opened with a plenary session which developed the theme of the Conference. Talks were given by Dean Crottogini, Dr. Efren Del Pozo of

TABLE 1
MEDICAL SCHOOL DELEGATIONS TO CONFERENCE

Argentina	4	Cuba	1	Mexico	9
Bolivia	2	Chile	3	Panama	1
Brazil	8	El Salvador	1	Peru	1
Colombia	2	Ecuador	2	Uruguay	1
		Guatemala	1	Venezuela	3
		Honduras	1		

the National University of Mexico, and Dr. Enrique Beltran, the Minister of Public Instruction and Social Welfare. Round-table discussion of the topics for the Conference followed for 2½ days. For the discussions, delegates were divided into five groups of approximately fifteen to twenty, with attempts to have representation from each country in every group. This was not always possible, however. There was no rotation of the membership of the groups. A president was selected from the group to preside. A secretary was appointed by the Organizing Committee for each round table. Dean Lapham and Dr. Cooper, who made up the invited American delegation, were not formally assigned to a round-table group and were able to visit several during the discussions.

All the topics were considered by each round table. After each session the presidents of the round tables met to prepare a common proposal, and one of the delegates was selected to present it to the final plenary session. Proposals were also offered from the floor. A single vote for each delegation was cast on the proposal by its president. Adoption for inclusion in the final report required a simple majority of the votes.

By agreement of the delegations, the formation of a Pan American Federation of Medical School Associations was considered in the round-table discussions and at the final plenary session. A small number of delegates attempted to use parlimentary maneuvers to prevent its consideration, but they were overwhelmingly overruled by the vote of their colleagues. The final resolutions of the Conference covered the original topics assigned, and they have been printed and circulated to the delegates and other interested groups.

There was agreement that the objectives of the basic sciences are to provide the foundation for proper understanding and the development of a rigorous scientific approach to the study of medicine. The basic sciences were considered to include: anatomy, histology, embryology, biophysics, biochemistry, physiology, pharmacology, microbiology and immunology, parasitology, pathology, psychology, and fundamentals of preventive medicine. Students were admitted to have serious deficiencies at the end of their secondary school education, not only in knowledge, but in scholarly approach—making it difficult for them to take advantage of the instruction in medical school. It was recommended that the situation be corrected by establishing a university-level premedical course to include the disciplines of mathematics, physics, chemistry, biology, and language. Several medical schools already require this additional preparation for students before acceptance to medical school.

The basic sciences were considered to require 2½ academic years of 10 months' duration or 50 per cent of the total time in the curriculum, excluding the final year of internship. About 36 hours a week were established as the time to be devoted to course work. Reconsideration of the relative amount of time devoted to the morphological sciences over

the functional sciences was urged. A philosophy of education was agreed upon to include: increasing the responsibility of the student in his education through group discussions, seminars, etc.; teaching the basic sciences to develop critical attitude and introduce the scientific method; increased laboratory work; better coordination and integration of the disciplines; orientation of the student to use multiple texts and the bibliographic literature; development of good methods for providing evaluation of students learning.

Although the proposal brought out strong debate, the Second Conference reaffirmed the importance of limiting the number of admitted students to the teaching capacity of the medical school. It was agreed that quality of preparation for the profession should not be substituted for quantity. Recommendations were made that selection be carried out by rigorous and firmly adhered to methods which might include the following: scholastic performance, achievement examinations, practical examinations, psychological evaluation, and personal interview.

The importance of libraries in educational programs was recognized, and their development and increased utilization were urged.

The need for more research activity in medical school was acknowledged, with the corollary requirement for properly trained basic science teachers and investigators. To stimulate interest in the basic sciences and provide educational opportunities it was considered important to introduce graduate programs leading to advanced degrees of Licenciate, Master, or Doctor of Basic Medical Sciences. The course leading to the degrees would be given by the medical faculties with the cooperation of other faculties of the University.

To further promote training in research and teaching in the medical sciences the delegates were persuaded that Training Centers should be established in institutions where a capacity for carrying out recognized scientific investigation had been clearly demonstrated. The Centers would have the following purposes: to prepare an adequate environment for scientific research and medical education; to produce more scientists; to promote and assist scientific research and improvements in teaching; to facilitate exchange of opinions and research results; to offer postgraduate courses.

Criteria were set up for designating Centers. These included: a capable full-time faculty, proper facilities, recognized contributions to science, adequate financial support, and good libraries.

Trainees at the Center would remain at least 1 year on a full-time schedule. Two years of advanced study at their own institution was considered advisable before being admitted to the Center. The trainees would be supported by fellowships from their own institutions, to which they would be expected to return for at least 2 or 3 years at the completion of their training period.

There was agreement on the value of creating a permanent Coordinating Center of Latin American Faculties of Medicine. It was voted to accept the offer of the University of São Paulo School of Medicine to act as its headquarters. The Coordinating Center would be financed from dues levied on Latin American medical schools. It would probably concern itself at first with the selection and coordination of the proposed Training Centers at the various institutions.

The delegates recommended that the organization of a Pan American Federation of Medical School be stimulated through national associations of medical faculties. The group through this ac-

tion ratified the recommendations of the Association of American Medical Colleges and the Latin American Deans attending the 53d annual meeting in Miami in 1960.

In reconsidering the Declaration of Mexico this Conference felt that it had not been widely known or its recommendations applied in many Latin American Medical Schools. In some, the provisions of the Declaration could not be fulfilled because of inadequate funds. The Conference ratified without change the Declaration and urged that it be given wider publicity and implementation through the Coordinating Center at São Paulo. The Coordinating Center was charged with studies on the extent of application of the principles of the Declaration and the experiences gained.

The offer of the University of Chile Faculty of Medicine to organize the Third Conference was accepted. The topics approved for consideration at that time were: graduate teaching, hospital training (internship and residencies) training of specialists; procedures for selecting applicants to medical schools; integration of teaching into basic, clinical and specialty periods; training of teachers and regulations and salaries for full-time positions.

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Medical Education in East Africa

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SUMMARIO

Le Universitate Markerere a Kampala es hodie le sol schola medical in Africa oriental (planos de universitates medical in Tanganyika e Kenya probabilemente non materialisara tosto). Le Universitate Markerere accorda le diploma de Licentiate in Medicina e Chirurgia post un curso preclinic e clinic de 5 annos que seque intimemente le curriculo medical britannic. Le production total de practicantes habilitate del Universitate essera inter 20 e 30 durante le pauc annos proxime ma on expecta que le numero crescera a 40-50 ante 1970. Del 141 studentes nunc matriculate, le majoritate son african, attrahite usque nunc quasi exclusivemente ab le Facultate de Scientia de Makerere. Nonobstante, proque le standardo de education secundari se ha elevate in Africa oriental, le entrata al schola medical essera directemente ab collegio ab ora. Le major parte de departmentos del universitate medical ha nunc edificios e laboratorios adequate pro inseniamento si non semper sufficiente pro le necessitates expandente de recerca. Un nove hospital, adjacente al schola es quasi completate, durante que le Hospital General Mulago (que pertineva antea al vetule Schola Medical Uganda), con 650 lectos, provide experientia clinic excellente pro le population studente actual. Le disposition del personal docente se summarisa in iste reporto, e on discute in detalio le contento del curriculo. Per le 3 annos clinic, on accentua le aspectos social e del ambiente, e studentes participa in activitates communitate de sanitate. Le Licentiato novemente qualificate reveni usualmente a su campania de Africa oriental pro experientia pre-registration. Usque nunc, on ha cercate education post-gradate in Europa, ma effortios se face verso poner super un base plus firme in Africa oriental le maestramento de maestros clinic e specialistas. Activitates de recerca ha essite vigorose a Makerere, le qual es attestate per le production de obras publicate per le schola in le 15 annos ultime. Nonobstante, le campo enorme pro recerca in sanitate mental in Africa sembla ancora a pena comenciate. In general, il ha ora un Africa oriental un centro active de inseniamento e pensamento medical, e si le disveloppamento economic mantene passo con le progresso politic on pote previder pro le futuro proxime melioration e expansion considerabile de education medical in Africa oriental.

There are some 30 medical schools in the British Isles; eleven of them are concentrated in London, and none is separated from its nearest neighbour by more than 150 miles. In the whole continent of Africa there is hardly half that number having full university or professional status; between latitudes 25° north and south there are only five medical schools in Africa, each 1,000 miles or more from its nearest neighbour. An account of some of these schools has recently been given in this journal (1).

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THE UNIVERSITY COLLEGE OF EAST AFRICA

Makerere College at Kampala in Uganda is the University College of East Africa. At the time of writing this college is the sole university institution and its faculty of medicine the only medical school in this region. Plans are well advanced for the establishment of sister University Colleges in Tanganyika (at Dar es Salaam) and in Kenya (at Nairobi), but it is unlikely that either of these will develop separate medical facilities in the immediate future. Thus, for some time to come the medical school at Kampala will continue to serve the whole area

from which Makerere and the new Colleges will draw their students—namely, Kenya, Uganda, Tanganyika, and Zanzibar. This is an area of roughly half a million square miles of extremely varied terrain and climate, populated by some 20,000,000 persons of many tribes and several races. Makerere is situated in the northwestern corner of this area.

Makerere's nearest medical neighbours are the University of Khartoum, 1,000 miles due north, and Lovanium, at Leopoldville, 1,200 miles west—to which is soon to be added the new medical school of the University College of Central Africa at Salisbury in S. Rhodesia, 1,200 miles to the South (2).

THE MEDICAL COURSE AND THE STUDENTS

Pending attainment of independent university status as a degree-granting body the final award in Medicine at Makerere is at present the diploma of Licentiate in Medicine and Surgery (East Africa), awarded on examination after a 5-year preclinical and clinical course which follows closely the current arrangement and content of the courses at British medical schools. The L.M.S. (E. Africa) is recognized by the General Medical Council of Great Britain as a registrable qualification, and licentiates therefore have the privileges and obligations of state-registered medical practitioners, and are entitled after 1 year's hospital work under supervision to practise independently anywhere in East Africa or in Great Britain.

The output of qualified practitioners from the Makerere school will be between 20 and 30 a year for the next few years, after which it may be hoped that it will rise slowly to 40–50 a year by 1970. At the time of writing (1960–61) there are 141 students in the clinical and preclinical courses. Of these 52 are from Kenya, 34 from Tanganyika, 54 from Uganda, and one from Zanzibar. The majority are African, ten are Indian or Pakistani, seven Goan. So far only five women have entered the school; two have qualified, three are still in residence. Medical students from England and from U.S.A. have occasionally been attached to the school for short periods during their clinical or preclinical studies. A Nuffield scholarship scheme enables two clinical students from Birmingham University to spend one term at Makerere during their last year.

Makerere is a residential college—unavoidably so, since there is no possibility of satisfactory student lodgings in or near Kampala for more than a fraction. There are five halls of residence for men and one for women, all on the College hill, which is about 1½ miles from the teaching hospital and medical school. Medical students spend short periods during their appointments as clinical clerks in residence at the hospital; otherwise they live in one of the Halls at the College, each of which houses students of many subjects, and of all seniorities and of different tribes and races.

ENTRY TO THE MEDICAL COURSE

Hitherto students have been drawn almost exclusively from the Makerere science faculty, being selected on their performance there in the intermediate or preliminary examinations for the London[1] B.Sc., a minority being admitted direct to the medical course from school or other university by exemption. Latterly the standard of

[1] The University College is in special relation with the University of London. Until such time as it achieves full university status, courses in the faculties of arts, science, and agriculture lead to degrees of the University of London.

secondary education in East Africa has been rising, with the expansion of sixth form work in the schools, and the intermediate B.Sc. courses at the University College are now to be discontinued. Entry to the medical school (as to other courses at the University College) from now on will be direct from secondary school, on performance in the Higher School Certificate examinations (equivalent to University "inter" or preliminary B.Sc.) taken at school. Required subjects are physics, chemistry, zoology or biology, and proficiency in English. This expansion and upgrading in the secondary schools all over East Africa is of importance for the impact it will have on society in general, not only for university education. It entails a considerable and costly expansion of library and laboratory accommodation and equipment, but its success will depend even more on recruitment of enough sixth-form teachers from abroad, for it will be many years before Makerere's output of graduate teachers, especially science graduates, will be able to keep pace with this expanding need.

Hitherto young men and women have come from school to embark on the preliminary science course at Makerere with fairly open minds, deferring their choice of career until their second year at college, to be decided only too often, in the event, by examination results. A high proportion of the ablest students have usually opted for medicine as first choice, so that the medical school has enjoyed an advantage in selecting for admission. This also is changing as the range of careers for young scientists widens, with good prospects for an honours B.Sc. in research or teaching or local industry, and with the establishment of full B.Sc. courses in Agriculture and (it is hoped shortly) in Veterinary Science. It will be interesting to see what effect on recruitment to medicine will now result from the necessity of making a choice of career at school, or at any rate before coming to college and mixing with medical and other senior students. There can be no doubt of the need for many more doctors in Africa. However, equally teachers, scientists, business men and administrators are needed, and on the supply of science teachers in particular the future supply of doctors must partly depend.

STAFF AND RESOURCES

Most departments now have modern buildings and laboratories in use or in course of construction, adequate for teaching if not in all cases sufficient for the expanding needs of research. This represents a big advance since 1946, when the buildings inherited by Makerere from the old Uganda medical school provided very meager accommodation. A new hospital (of which more will be said) nearing completion on a site on Mulago Hill adjacent to the preclinical school and library will enormously enhance the conditions for clinical research and teaching, as well as the nursing and medical service and comfort of the patients.

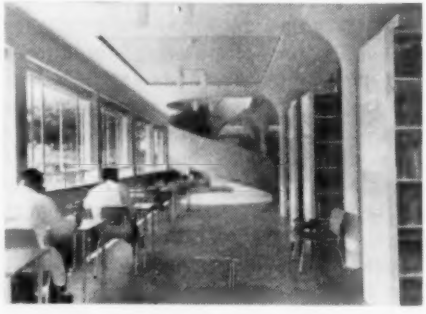

FIG. 1.—Part of the new Albert Cook memorial library of the medical school. (*Photo by E. S. Adams.*)

TABLE 1
DISPOSITION OF THE TEACHING STAFF

Department	Whole-time University staff	Other recognised part-time teachers
Anatomy	Professor + 3	1 or 2
Physiology and Biochemistry	Professor + 3	....
Pharmacology	Senior Lecturer	....
Pathology and Medical Microbiology	Professor + 4	4
Forensic Medicine	....	1
Preventive Medicine	Professor + 1	....
Medicine	Professor + 4	2 or 3
Psychiatry	....	1 or 2
Surgery (including Ophthalmology and Otolaryngology)	Professor + 4	7
Obstetrics and Gynecology	Professor + 2	3
Pediatrics	Professor	2
Dental Surgery	....	1
Anesthetics	....	2
Radiology	....	1

The Albert Cook medical library, named after the man who pioneered western medicine as a missionary in Uganda, contains some 20,000 volumes, two-thirds of these being bound journals (Fig. 1.). The library receives 200 current journals, mostly English language, some German, French, and Belgian. There is also a medical illustration unit, run in conjunction with the medical museum. A new students' club and refectory, with hostel for accommodation of students while in residence on full-time hospital duty, is to be built.

The disposition of the teaching staff (1960/61) may be usefully summarised (Table 1).

In the clinical subjects a considerable contribution in the teaching programme is made by consultants on the hospital and laboratory staffs who have the status of honorary lecturers.

Most of the present staff are from overseas. One Makerere licentiate who is also a graduate of Cambridge, England, holds a preclinical lectureship. A Nigerian with British qualifications recently held a lectureship in medicine. A few are graduates of South African and Australian universities, but the majority of the teaching and consultant staff are from Britain.

Technicians and demonstrators are two important categories of staff whose recruitment in East Africa has never been easy. Only in the last year or two has serious attention begun to be given to the training of better educated Africans as laboratory technicians, and the local supply will be small for many years to come. Meanwhile reliance is placed on expatriates here also, when they can be found, and the contribution which they can make in their departments is out of proportion to their number. The position as to demonstrators may be expected to improve as the output of science and medical graduates increases during the next few years.

PRECLINICAL STUDIES

Two academic years (6 terms) are spent in the study of anatomy and physiology. In anatomy, complete dissection of the human body is required, with attendance at lectures and demonstrations in topographical anatomy, and lectures and practical courses in vertebrate anatomy and embryology, neu-

rology, histology, and in clinical and radiological anatomy. The current syllabus of the course in physiology and biochemistry is the same as that for the external B.Sc., of the University of London. Practical work and lectures on general physiology and biochemistry are taken in the first year. The second year includes more advanced work on the central nervous system, intermediary metabolism, oxidation mechanisms, and on nutrition, gas transport, hematology and endocrinology. Practical and oral examinations in anatomy and physiology are held at the end of the second preclinical year. During this second year the study of pathology is introduced by weekly lectures and demonstrations in pathological physiology and elementary general pathology.

THE CLINICAL COURSE

The course occupies 3 academic years. Clinical terms are of 10–11 weeks, three terms in the first year and four in the second and third years (there being no long vacations), a total of eleven terms. Qualifying examinations are held in pharmacology in the first year; in pathology, forensic medicine, epidemiology, and environmental sanitation at the end of the second year; in social medicine and the clinical subjects at the end of the third year.

In addition to the lectures and demonstrations in pharmacology a full course of practical work in this subject is being developed as the necessary equipment and technical staff are acquired.

In the clinical subjects and in pathology emphasis throughout is on work in the wards and clinics of Mulago Hospital and in the laboratories and autopsy room following the English system of student appointments as clinical "clerks" in the various departments, rather than by systematic lecturers.

For some years past the first clinical term has been occupied by an introductory course which has combined a fairly intensive programme in pathology and pharmacology, with instruction in clinical methods (given in the departments of medicine and surgery) and an introduction to preventive and social medicine, pediatrics and medical psychology. This defers by one term the close and personal contact with patients and clinical problems to which students look forward, and is unpopular on that account. It is probably true that omission or reduction of the introductory instruction in clinical methods at this stage would not be a serious loss, because these skills and insights are only to be learned by assiduous practice over a period of time. Nevertheless, some acquaintance with pathology is essential before entering the wards, and the more time can be given to this subject and to pharmacology (requiring as they both do long periods of laboratory work) before starting the clerking appointments the better. In this way students will be freer to devote their whole time to their patients and to discharge properly the obligations which they undertake as clinical clerks in the wards and clinics during the following terms. The clerking appointments are currently spaced as shown in Table 2, thus leaving the first clinical term for the introductory course and the tenth and eleventh for revision and such special subjects as have not already been completed. Ophthalmology, laryngology, dental surgery, and anesthetics are normally done during the periods of surgical clerkships; psychiatry, chest diseases, and venereal disease during medical and gynecology clerkships.

Students are required to undertake

TABLE 2

SPACING OF CLERKING APPOINTMENTS

First year	2nd term	Medicine or Surgery, junior clerk
	3rd term	Surgery or Medicine, junior clerk
Second year	4th term 5th term 6th term 7th term	In each term clerk in *one* of the following departments: Obstetrics Pediatrics Gynecology Pathology
Third year	8th term	Surgery or Medicine, senior clerk
	9th term	Medicine or Surgery, senior clerk

24-hour resident casualty and admission roster duties with their units in the medical, surgical, and pediatric divisions, and to spend 1 month of their obstetric clerkship in residence at the hospital.

PATHOLOGY

As already noted this subject is introduced in the preclinical years, followed by more intensive teaching of general pathology and microbiology in the first clinical term and by systematic instruction continued through the second year, at the end of which the qualifying examination in this subject is held. An important feature in the course is the term spent as a pathology clerk, the time being divided between the divisions of morbid anatomy and microbiology. Concurrently a laboratory course in clinical and chemical pathology is given, one session a week, throughout the second clinical year. In the morbid anatomy division each student clerk is able to acquire considerable experience in assisting at autopsies and is able to follow through the morbid histology of his patients. Both clinical and pathology clerks and staff attend histology seminars held twice a week on medical and surgical cases. As a teaching hospital Mulago is fortunate in the high ratio of autopsies to deaths. Some 500–600 autopsies a year are done, an important foundation for both teaching and research.

PREVENTIVE AND SOCIAL MEDICINE

Lectures, seminars and field expeditions are spaced throughout the 3 clinical years. Students also take part in longitudinal family studies in the neighbourhood of the department's rural health centre 8 miles from Kampala, and in the community health education activities there. The social and environmental aspects of disease are perhaps even more continuously and obviously relevant in African clinical practice than in Europe. This is true of hospital work and clinical teaching in all departments. However, too often in the local circumstances practice falls short of precept. There is a great need for a cadre of health visitors and home nurses to be built up, as also of general practitioners, so that the benefits of hospitalisation can be followed up in the home and the need for it reduced.

The student health service of the University College is in the charge of the Senior Lecturer in Preventive Medicine. In the more sophisticated context of college residential life this is an admirable arrangement for practical demonstration of the unity of preventive and curative medicine, complementary to that which the rural centre provides.

Cooperation with the clinicians is close. Students working on the clinical units present selected cases from their wards or clinics at social medicine seminars. Child welfare clinics and child health surveys are conducted jointly by the pediatrics and preventive medicine departments with student participation.

THE TEACHING HOSPITAL

Although the Makerere medical school has existed as a University Faculty for

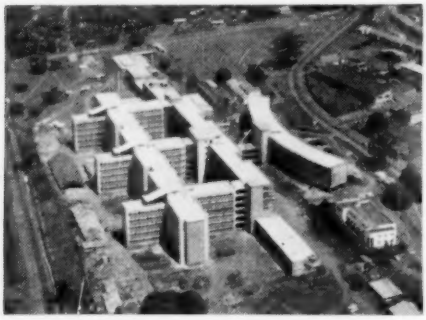

FIG. 2.—The new Mulago Hospital nearing completion. Some of the medical school departments (Physiology, Biochemistry, Anatomy) are to be seen at extreme right; and some of the old hospital wards at extreme top right. (*Photo by Uganda Information Department.*)

FIG. 3.—Pathology Department and lecture theatre. (*Photo by E. S. Adams.*)

only 15 years, teaching began at Mulago Hospital long before that (5). The old Uganda Medical School originated here in the 1920's, with the object of training sub-professional medical assistants for the government service. It was the direct forerunner of the present-day University Medical School which has developed out of it without any break in continuity. Thus, Mulago has a relatively long tradition as a teaching hospital, as it has as a Nurses' Training School, though starting in both cases from the simplest beginnings.

Mulago is an African general hospital of 650 beds. It is large enough to provide excellent clinical experience for its present student population, but structurally it has outgrown itself. The unplanned layout of bungalow wards and temporary buildings placed haphazard and widely separated on a steep slope is a grave disadvantage from every point of view in a hospital of this size. A modern 5-storey hospital of 900 beds is now nearing completion on a site immediately adjacent to the medical school (Fig. 2). This will bring wards, theatres, clinical laboratory and radiology services, out-patient, and casualty departments all into spatial and functional relationship. With the possible retention of part of the old hospital for special uses this will provide most departments with more space than they now have. It will also add high-amenity accommodation for any who wish to pay for it, by incorporating the service of the Nakasero Hospitals which formerly catered for European and Asian patients only.

The participation of hospital consultants in the teaching programme and of university clinicians in the routine hospital service are complimentary. A number of the hospital and pathology consultants are recognised by the university as teachers and take a considerable share in the teaching programme. In some of the special branches, they are responsible for the whole of the teaching, for example in psychiatry, forensic medicine, anesthetics, ophthalmology, venereology, otorhinolaryngology, dental surgery, and radiology. Likewise, members of the university clinical and pathology departments have honorary consultant status in the hospital, where they carry a full share in the routine hospital service.

The hospital is administered by a physician superintendent who is responsible to the Chief Medical Officer of the Uganda Ministry of Health. Non-university appointments are made by the Ministry or by the Colonial Office in Britain. Proposals for placing the administration

and staffing of the hospital on a broader footing, in the hands of a Board of Governors with Ministry, University, and other appropriate representation are now under consideration.

THE CLINICAL MATERIAL

Uganda is an underdoctored underhospitalised country. The pressure upon available hospital beds at Kampala is acute, and the patient "turnover" is high. If at times in the old hospital this has led to overcrowding and the too early discharge of patients, it has certainly provided an extensive and varied clinical experience for every student.

Approximately half the patients come from Uganda within a radius of 50–100 miles of the hospital, the remainder from further afield, including Ruanda-Urundi, Congo, Kenya and Tanganyika. The variety of language and food habits impose obvious difficulties, but by ingenuity and persistence a full history can usually be obtained.

It is sometimes objected that a medical training in the tropics must necessarily be unbalanced, owing to a preponderance of tropical diseases and the lack of some others. An equally valid objection might be held against the rather narrow preoccupation of much teaching in the medical schools of Europe and North America when considered against the background of the world health situation.

Certainly, the day-to-day clinical problems which the student meets in East Africa differ in certain respects from those confronting his opposite number in London, Berlin, or New York. They reflect, of course, the local disease incidence and also local practice as to hospitalisation. Because of primitive homes and lack of general practitioners, more minor illness and normal obstetrics is admitted at Mulago Hospital than would be the case in England, and it is sometimes correspondingly difficult to admit for "cold" surgery or investigative medicine as selectively as might be wished in the patients' interest or in the interests of teaching. Nevertheless, the material is amply sufficient and varied for instruction in the principles of pathology and medicine, well supported as it is at this particular school by autopsy material.

Analysis of admissions on the medical side of Mulago Hospital (Shaper and Shaper, 1958) shows a high proportion of acute infections (especially of the respiratory tract, including tuberculosis, and of enteric), anemias, hepatic, renal, and cardiovascular disorders and malignant disease, and a relatively smaller proportion of neurological and endocrine disorders. While ischemic and thyrotoxic heart disease are extreme rarities in African (though not in Asian) patients here, hypertensive, syphilitic, and rheumatic heart disease are plentiful. Bronchial carcinoma (three cases a year at this hospital), appears to be still uncommon in Africans in Uganda, whereas primary liver carcinoma is common. Likewise, in the surgical wards hernia and volvulus and tuberculosis of bone and joint occupy a disproportionate number of beds; appendicitis and cholelithiasis and renal calculus, relatively few. Malignant disease differs in kind but not in quantity from that in European practice. Malnutrition and infection predominate in pediatric practice, and admissions of infants and children under 5 predominate at the expense of older children. Of tropical infections, malaria and hookworm infestation are ubiquitous in their various guises in susceptibles and "immunes," but more often have to be dealt with concurrently with other complaints than as the sole presenting illness. Typhoid, leprosy, schistosomiasis provide both surgical and medical interest, as well as some intractable problems in social and preventive medicine. However, in none of the clinical divisions is prac-

tice dominated by tropical parasitology as such. It reflects rather a social, nutritional, and immunological background in many ways different from that of the "west," in which nevertheless most of the diseases of temperate climates flourish exceedingly.

The sum of all this is unlimited scope for clinical and epidemiological research and rich and varied teaching material abundantly adequate for instruction over the whole range of pathology and clinical diagnosis and management. Its very differences from medicine, as presented in the standard British and American texts, are stimulating; they do not curtail study of the basic principles of western medicine, they do sometimes illuminate. If what the student sees in his daily work has a local flavour, it is of course important not to allow teaching and thinking to become too parochial. Many of these students will study later overseas; some will perhaps practice there. More important are the differences of race and custom, the contrasts of climate and epidemiology, within East Africa itself, as well as the speed of social change here. These call for a wide outlook and alertness to new problems and changing conditions among practitioners and their teachers.

By incorporating the two existing Kampala hospitals, the Nakasero which at present caters largely for European and Asian patients and Mulago hitherto entirely for Africans, the new hospital will be a means of further widening the range of medical practice and teaching. While fee-paying patients on the high-amenity floor will no doubt be exempt from formal teaching, they will bring with them some of the clinical problems less often encountered in the African patients, and it is likely that patients other than Africans will increasingly be admitted to the general wards.

INTERN TRAINING

The holder of the Makerere qualification (L.M.S., E. Africa) is eligible for provisional registration as a medical practitioner immediately, and for full registration after 1 year's work in approved hospital appointments. The newly qualified Licentiate usually returns to his home country (which may be anywhere in East Africa) for his preregistration experience, if he can obtain a suitable post there. At present there are four hospitals in East Africa where internships are approved for this special purpose—at Nairobi and at Mombasa in Kenya (four in Medicine, four in Surgery), at Dar es Salaam in Tanganyika (three in Medicine, three in Surgery, one in Obstetrics) and at Kampala (eight in Medicine and Pediatrics, six in Surgery, six in Obstetrics); these provide between them some 35 resident house appointments. More posts will be required before very long as the output from the Medical School grows; in obstetrics more are needed now. The approval of these posts in East African hospitals rests with the Makerere Medical School. Aspects considered especially important for this first preregistration year are the standing and accessibility of the senior staff, the number of patients for whom the intern will be responsible, the availability of other junior staff to share the load (especially in respect to casualty and out-patient work), the radiology and clinical pathology and library facilities, the standard of nursing, and the fully resident nature of the appointment.

Most appointments run for 6 months, and the usual practice is to complete one in medicine and one in surgery or obstetrics before registration. In fact, most young doctors take one or more further intern appointments after registration, thus either widening or intensifying their experience before embarking on

the career of their choice. No doubt fiercer competition may make these senior intern appointments more difficult to obtain as time goes on, but the required preregistration year does at least ensure that the new graduate gains his first experience of working on his own under reasonable conditions.

POSTGRADUATE STUDY AND TEACHING

It is only 15 years since professors were appointed to the preclinical departments at Makerere and only 10 since wholetime university appointments were made in the clinical and paraclinical subjects. The main effort during this period has been in building up the teaching strength, student numbers, and physical resources of the undergraduate school and consolidating its standards. There has been no lack of research activity in the departments, but formal postgraduate study and training remained until quite recently a comparatively small issue, owing to the small number of graduates and the limited facilities throughout East Africa for their training. With improved facilities and larger staffs, more and better educated graduates, and the expanding need for specialists and consultants, the situation is now changing rapidly, and more attention is being given to Makerere's opportunities and responsibilities at this level.

Many of the earlier graduates from the Makerere Medical School (and from its predecessor the original Uganda Medical School) have already been to Europe for travel and study. The majority have taken postgraduate diploma courses in public health and have been successful, returning to East Africa to take up semi-administrative posts as district or provinicial medical officers or medical officers of health. A few have studied clinical subjects—obstetrics, psychiatry, child health, tuberculosis, ophthalmology, radiology—not more than one or two in each, and have obtained diplomas of varying status in these subjects.

Meanwhile a start was being made toward placing the training of clinical teachers and consultants on a firmer basis in East Africa. Registrar posts in medicine and surgery (formerly unknown) were created at King George Hospital at Nairobi and Mulago Hospital at Kampala, and at Kampala also in pathology, obstetrics, pediatrics and anesthetics. Proposals are now under examination for strengthening further the preclinical and pathology departments at Makerere to ensure a well founded scientific basis for postgraduate work in the clinical disciplines. At the clinical level it is hoped by the interchange of registrar appointments between Kampala and Nairobi hospitals, and by exchange of visits between their teachers and consultants, to make the widest possible use of the facilities already available in East Africa, integrating them at postgraduate level within the orbit of the medical faculty of the University of East Africa.

Hitherto, apart from preparatory clinical training of a general nature, such postgraduate success as has been achieved has been almost entirely on the basis of study and examination overseas. It is a curious fact that by far the commonest diplomas sought by Makerere doctors (and on their behalf by the government medical authorities who employ them) have been in Public Health or in Tropical Medicine and Hygiene, two subjects above all for which appropriate conditions of study are to be found more readily in Africa than in Britain. It may well be asked why has not more support been forthcoming to build up in tropical Africa university departments of Social and Tropical Medicine staffed and equipped to develop research and undertake postgraduate in-

struction for local graduates and others who are to work in Africa?

Undoubtedly one of the attractions the British diploma courses hold for African doctors lies in the travel and residence overseas which they entail. There is a real danger that support for expansion locally of postgraduate facilities, so desirable academically, might wither for lack of local students owing to their keen ambition to see the outside world at any cost. Theirs is a laudable ambition and one to be encouraged. One way of meeting it would be to provide traveling Fellowships or Studentships for award *after* a period of postgraduate study (and possibly even examination) at their own university in East Africa. To obtain the best value from his time abroad, the graduate should surely spend some time actually at work in the overseas environment, not solely in preparation for examinations but rather, if possible, fully involved as a working member of a unit, in a hospital or laboratory or institution of repute. Whatever he does with his time overseas, his eyes will be more open, and he will get more out of his travels if he is not still preoccupied with examinations—or at least is able to face them at the beginning of his visit instead of at the end (6). This implies the necessary facilities and preparation in his own country, which in turn depends upon ability to attract first-class men from overseas to the staff (and their willingness to be attracted), and money to pay them and equip their departments. Apart from the interests of the individual student, the importance on general academic grounds of promoting advanced studies and research in appropriate subjects at the local university requires no argument.

RESEARCH

The output of published work in the last 15 years speaks for the liveliness of the Makerere Medical School. Particular interests in the clinical and paraclinical departments have included protein malnutrition, hepatic and pancreatic disease, aspects of cardiovascular disease, diabetes, various aspects of malignant disease including the establishment of a Cancer Registry and investigation of cyto-toxic drugs, and participation in cooperative clinical trials in pulmonary tuberculosis. The establishment of a Medical Research Council Unit for Infant Malnutrition at Kampala in 1953 was a tribute to the achievement of earlier workers here and has been a livening influence since, notably in collaboration with the departments of anatomy and social medicine and pediatrics.

Among the subjects appropriately studied in the preclinical and pharmacology departments of an African university have been physical anthropology, human paleontology, and comparative primate anatomy; the physiology and anatomy of some large mammals (gorilla, rhinoceros, hippopotamus, giraffe) and of some smaller creatures (monkey, galago, lemuroids and tropical fish); the isolation of toxic and therapeutic agents from local plants and the application of the use of paralysing drugs for the control and live study of large wild mammals.

ACADEMIC CONTACTS

External examiners approved by the University College are appointed in all subjects, usually colleagues from British universities, sometimes from South or West Africa or Sudan. Distance makes this an expensive item in the College budget, but it is one of the highest value, not only as a safeguard of academic and professional standards but also as one of the means of diminishing academic isolation—an important consideration for teachers separated by 1,000 miles from their nearest university neighbours and perhaps by very much

greater distances from colleagues sharing their individual research interests.

The Makerere teaching staff enjoy the privilege of free travel overseas every 2 years and are thus able to spend alternate long vacations in Europe or elsewhere—another expensive item but again an essential one even more on academic than on health grounds.

Being only a few miles from an intercontinental airport, Makerere suffers no lack of visitors. Most welcome are those with a common interest to discuss, and rarely a week goes by without a visit in one or other department which begins or renews a valued research contact. British members of the East African Council for Medical Research, generally experts in tropical medicine, visit East Africa for the Council's annual meetings and conference. Local professional associations of physicians, surgeons, and pathologists bring together colleagues from various parts of East Africa. Close relations exist between the hospital pediatric department and the Hospital for Sick Children in London, maintained in a practical manner by secondment of staff and annual consultant visits.

The school has had two Visitations from the General Medical Council of Great Britain, in 1951 and 1957, in connection with recognition of the Makerere medical course and qualification.

THE OUTLOOK

Psychiatry.—This subject is not yet adequately represented at Makerere. Successive consultants in charge of the Mental Hospital near Kampala have given generous time in lecturing and arranging clinical demonstrations for students and in consultation work at the general hospital; but this is not enough to give psychiatry a place commensurate with its importance in relation to all branches of medicine. The clinical material available at the Mental Hospital is necessarily restricted in kind. During their clinical course students need to see psychiatric practice applied in a wider field and in close association with the other clinical disciplines in the environment of the general teaching hospital. Proper conditions are needed to develop postgraduate training in psychiatry at intern and specialist levels, as well as for general practitioners. There is a huge field for research in mental health and disorder in Africa (W.H.O. Report, 1959) as yet hardly touched. Of all this Makerere is keenly aware. Proposals for a professional department of psychiatry have been worked out, with experienced advice. Regrettably, funds to implement them are not available through government budgets, and they must seek to attract finance from other sources.

Out-patients.—A part of clinical teaching of immense importance is that given in the hospital out-patient departments; the teaching material is different, and the methods are different from those in the wards—in both cases nearer to that of general domiciliary practice. Here is another weak side in the Makerere teaching programme. This is not for any lack of out-patients. In countries where Western medicine is new there are few family doctors and little knowledge of simple methods of caring for minor illness and injury in the home. There are few health visitors and no district nurses. Everyone and everything comes to hospital. The out-patient department's function as a protective filter becomes paramount if the in-patient service is to survive; and the filter has to withstand terrific pressure. The general crush and tempo of work are seldom compatible with orderly teaching or with the consistent high standards that students ought to see during their training. They do get excellent practical experience in the casualty de-

partment, but teaching in the consulting clinics is carried on often under considerable difficulty.

In the neighbourhood of the larger towns the beginnings of a tradition of African general practice can be seen, based on private clinics and nursing homes. However, this caters largely for the more prosperous, and shows little sign as yet of taking medical care to peoples' homes or expanding into rural areas. This is a social and professional problem which will require social legislation and state finance to solve it, as well as a greater supply of local medical graduates. Meanwhile, the contribution of the medical school will be to improve and expand out-patient teaching, using the better facilities of the new hospital and the satellite clinics and health centres which are proposed to feed and serve it. Once good domicilary practice develops in the neighbourhood, it may be possible to arrange for students to spend a few weeks of their course attached to general practitioners as is done in some British medical schools.

Postgraduate Studies.—Ways in which postgraduate study and research may develop have already been suggested. In the clinical subjects (including anesthetics) and in pathology much will depend upon the support the science and preclinical departments are able to give. As numbers grow it should be possible to develop honours or special degree courses in some preclinical and related subjects. This would make it possible for abler students to obtain a B.Sc. before entering the clinical course.

New medical schools.—Other potential teaching hospitals in East Africa are the King George VI hospital in Nairobi and the Princess Margaret at Dar es Salaam. Undoubtedly they will one day develop into full medical schools in association with the new university institutions to be founded at these centres. How soon this may be is difficult to forecast. Meanwhile, the facilities for intern and more advanced postgraduate training at these hospitals and at the larger provincial centres need to be developed and integrated.

In all this much will depend upon recruitment and training of consultant and technical and nursing staff both in East Africa and for at least the next 10 or 20 years from abroad also. Not only is quality vital, but so also is numerical manpower without which the immense pressure on the routine hospital service cannot be successfully tackled without detriment to teaching and research and professional standards.

The future.—There is in East Africa now a lively centre of medical teaching and thinking. If standards can be maintained and improved on during the next few critical years the pattern will be set. If economic development keeps pace with political progress it should be possible to look forward to the foundation of new and rival schools, as soon as the student potential shows signs of exceeding Makerere's capacity.

Not the least of the benefits deriving from the establishment of an indigenous medical school are the indirect contributions it makes by its very existence to the general level of professional practice and conduct in its neighbourhood, as well as the stimulus to new thinking and action in research and social policy. These are things that no amount of money spent on sending men and women overseas for their initial professional training can achieve in quite the same way.

ACKNOWLEDGMENTS

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Medical Education in Nigeria

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SUMMARIO

Le prime schola medical aperiva in 1930 in Yaba. In 1934, su programma original de studio esseva facite simile al anglese. Quamquam, le inseniamento esseva facite principalmente per instructores non-medical o non-professional; facilitates esseva de un natura tempori, e le total structura del schola cadeva si tanto sub standard que il sembla que il habeva pauc regret quando illo se clausurava in 1948. Circa iste tempore le total tendentia de education plus elevate in Africa Occidental Anglese cambiava. In Nigeria, le Collegio Universitate a Ibadan, inglobante un facultate de medicina, esseva instaurate in le primavera de 1948. Usque personal, matriculation e facilitates attingeva certe standardes, le schola esseva ponite sub le patronage del Universitate de London. Iste parentate, ben que un association inestimabile in le passate, essera separate gradualmente ab 1962.

Al presente, le Facultate de Medicina de Ibadan se occupa in un estimation complete del curriculo; un consideration de policia es le question: qual genere de medico deberea un schola medical in un tal pais visar a producer? Durante que alicun educatores, in un panico a causa del enorme problemas de sanitate que les confronta, consilia le abassamento de standardes academic pro producer plus tosto un plus grande numero de medicos, le opinion del majoritate sembla considerar melior le recognoscentia que il ha grande areas de medicina que pote multo adequatemente esser practicate per auxilios non-medical ben-maestrate; iste relevera le carga del medico sin bassar le standardes in education medical. Nonobstante, il es essential que facilitates de schola medical es augmentate pro admitter un plus grande numero de studentes. Iste necessitate ha essite completemente recognoscite in un Papiro Session de Governmento Federal, que assecura etiam que on dara omne incoriagiamento al universitates regional pro establir hospitales docente de standardo approbate. Le total programma propone de producer 400 medicos per anno ab 1975 ad hic (al presente, Nigeria ha 800 medicos pro un population de 37 milliones). Il sembla certe que le matriculation annual de studentes a Ibadan expandera pro permitter un classe graduation de 100 per anno con un altere schola a Lagos, e possibilemente un instituto de scientia basic a Ibadan. Tal expansion leva le question de recrutamento del personal. Durante que al principio le personal esseva europee quasi in toto, iste situation se cambia rapidemente: 2 capites departmental son nunc nigerian, como anque plure conferentistas senior e 50% del registratores senior; practicamente omne medicos residente e le total personal infirmera hospitalari son nunc africanos. Nonobstante, le lista de applicantes, africanos o alteres, es troppo parve, particularmente in certe specialitates. Le education postgraduate es in plus un affaire de anxietate. A parte del maestramento in servicio del internos e residentes il ha mancate in toto usque ora.

HISTORICAL BACKGROUND

Although there is no easily accessible record of when the first Nigerian qualified in medicine, the first to be employed by the Government of the territory was a Dr. Oguntola Sapara in 1896 (1). Before then and for many years afterwards, Nigerians wishing to study medicine had to do so abroad, mostly in the United Kingdom or Ireland.

In 1927, the Government of Nigeria decided to start a medical school which would train Nigerians locally for a diploma which would be valid only within the frontiers of the territory. This medical school opened in 1930, at Yaba, near Lagos. In 1934, it transferred some of its activities to the Higher College, Yaba, a technical institute which provided the premedical training and some other courses. It was intended that the annual intake should be twenty, chosen by competitive examination, similar to the matriculation examinations of Brit-

ish universities. This number was never reached, the usual annual class being six to eight. The average age at entry was 19–23, although in the case of medical students they were often as old as 25 because of delays and difficulties with their earlier education. After a year or 2, the original plan of the course was modified, and, from 1934 onward until the final closure of the school in 1948, the plan was similar to that of a British medical school. The students studied for 6½ years, made up of a premedical course of 1½ years, a preclinical course of 2 years, and a clinical course of 3 years, the subject matter in all the years being similar, in title at any rate, to that in other medical schools. The teaching however, was not undertaken by professional teachers. The total full-time staff at any one time never exceeded nine —mostly nonmedical—and the clinical teaching and pathology teaching was undertaken by the various medical specialists in the government service who happened to be posted to Lagos. Not surprisingly, some of these had greater teaching ability and enthusiasm than others, and it seems that the quality of the instruction was very variable indeed. The accommodation was for the most part of a temporary character, and, in general, it may be said that the whole structure and organisation of this school fell far below the standards commonly associated with medical schools. The undertaking seems to have been ill-starred from the first. Many educated Nigerians of the time looked upon the venture as a substitute for real university education rather than as a step toward it: many of the diplomates and students resented the inferior status professionally and financially which they were accorded by the government. There seems to have been little regret when the school finally closed down in 1948.

About this time, the whole trend of higher education in West Africa changed. In 1946, the British Government had set up the Asquith Commission to enquire into the whole matter of the provision of higher education in the Colonies (then), and how the universities in Britain might assist in this. The Elliott Commission specifically directed its attention to British West Africa. It was British and West African in its composition in almost equal proportion, and among many other things it caused to be set up University College Ibadan and, as part of this, the Faculty of Medicine. From the point of view of the present paper the main outcome of the Asquith Commission was to create the Inter-University Council for Higher Education in the colonies ("Overseas" has now been substituted for "in the Colonies") which made available to the new academic bodies created on their advice the whole wisdom and experience of the universities of the British Isles.

The first Principal of University College, Ibadan, Dr. Mellanby, arrived in 1947, the first member of the medical Faculty in the spring of 1948 and in the autumn of that year the medical school began teaching. The premedical training was begun at Ibadan, the preclinical started at Lagos, and the foundations of the clinical school were laid in a local Ibadan hospital of 120 beds.

THE SPECIAL RELATIONSHIP WITH THE UNIVERSITY OF LONDON

It might be argued that a new institution such as this ought to have devised a fresh curriculum specially suited to the medical situations of West Africa; informed Nigerian opinion was not of this view, but wished to have a university qualification of unquestioned and established standing from the outset. This imprimatur was provided by the Special Relationship with the University of London. With the proviso that num-

ber and quality of staff, accommodation, equipment and governance should first reach certain standards, the university provided sponsorship of the training and degrees offered and has continued to do so. This relationship will be gradually severed from 1962. While it has in many ways circumscribed the format of the curriculum, it has been an invaluable and almost indispensable association. The relation has proved a remarkably flexible one, with full consultation on all matters and with the fullest possible weight always being accorded to the views of the Ibadan staff. As has been said, this system is nearing its close, and at the moment of writing, the Faculty of Medicine is engaged in a complete reassessment of the whole curriculum and of its applicability to West Africa.

THE CURRICULUM

The annual intake of students is 60, allowing for a final output of 50 per annum. The students must satisfy the minimum requirements of entry to the University of London. For a number of years the number of students of suitable quality fell short of the places available, but with rapid improvement in the secondary schools the quota is now being filled and an increasing number are presented with the General Certificate of Education at the advanced level, exempting them from premedical studies. Anatomy, Physiology, and Pharmacology were taught at Lagos until 1952, when new laboratories became available at Ibadan. These subjects are studied for a period of 2 years, at the end of which an examination is held. Like all examinations at Ibadan, this is conducted exactly as for internal examinations in London, and examiners from London take part along with the Ibadan teachers. Up to this point, the course is substantially that followed in any London medical school.

The Nigerian Government of the time had been rather tardy in carrying out the recommendations of the Elliott Commission on the need for a suitable teaching hospital, and, in 1951, when the first batch of students reached the clinical stage of their course, it was necessary to seek help from the medical schools of Britain. This aid was freely given, and an arrangement was arrived at whereby the clinical part of the course was pursued at practically all the British medical schools, each agreeing to take a stipulated maximum number of our undergraduates. Some of these acquired the degree of the adoptive school, while others took the London degree. Altogether, about 95 doctors qualified by this means before the arrangement came to an end with the completion of the new teaching hospital in Ibadan in 1957. Since then the complete medical course has been conducted on Nigerian soil. The first group of fourteen sat the London M.B.B.S. final examination at Ibadan in the autumn of 1960, and thirteen passed. The examinations are held twice a year, and the numbers coming forward will increase rapidly. The next graduating class will number 26, and within the next 3 years will reach the original target of 50.

Broadly speaking, the curriculum which has been followed at Ibadan for the past 3 years is on traditional London lines, with several important modifications. Pediatrics is studied for a full 3-month term, and obstetrics and gynecology for a total of 6 months. Preventive Medicine, which has all but vanished from the undergraduate course in London, is studied for a full term and includes a good deal of field work. A great deal of emphasis is placed on clinical pathology and on the associated laboratory training. But the real content of the curriculum is not to be judged from the printed timetables,

which do not, in any case, vary so very fundamentally from one medical school to another. It is rather to be got from a consideration of the material available for teaching in a medical school situated in an indigenous African city of probably 700,000 inhabitants, in which there are no more than twelve general practitioners, and another small hospital of 150 beds to cater for the medical needs of this vast conglomeration of people. Although with difficulty at times, the wards are purposely protected against that overcrowding which is so common in tropical hospitals and which so readily vitiates teaching. They are supplied with cases both by outside reference from hospitals in all parts of the country and by an admission mechanism in our outpatient departments which ensures a supply of cases not only of the exotic and puzzling, but also of the common and representative. The undergraduate sees not only those conditions and patterns of structural and functional failure which are the stock-in-trade of medicine all over the world, but also inevitably sees the conditions typical of a tropical and underdeveloped territory—infectious, nutritional, and genetic. The average age of patients is lower than among hospital cases in Europe nowadays, the cases are more often remediable, the variety is great, and the turnover brisk, so that for the bright young student the experience of clerking can be exciting. There is little doubt that a student trained in Ibadan is very much better equipped to deal with the medical situations of Tropical Africa than one trained in a temperate country. At the moment of writing, the Faculty of Medicine has set up committees and working parties to reconsider the whole curricular structure and teaching policy in order that it may provide that type of medical training most appropriate to the tropical belt of Africa. To this end, it is hoped to send observers to other countries dealing with similar problems, not only in Africa but also in the Americas, India, the Far East, China, and the U.S.S.R. Wisely, the College started off with a well-established curriculum of undoubted excellence and repute. It modified this within the permitted limits as circumstances demanded. It now seems that this teaching system may need, if not complete replacement, at least extensive refitting.

At this point, a consideration of fundamental policy enters. What sort of doctor should a medical school in such a country aim at producing? There are apparently intelligent people who visit Nigeria and who, shaken by the size of the health problem, advocate the panic policy of lowering the academic sights, and of producing a larger number of sub-standard practitioners, or of maintaining a dual standard of excellence with small numbers of educated men surrounded by a dense haze of the merely trained and mediocre. The temporary advantages of this, if there are any, are likely to be offset, in the long run, by the creation of a large vested interest resistive to change.

The better policy is surely to recognise that there are considerable areas of medicine which can be very capably practised by nonmedically qualified auxiliaries well trained in these well defined and limited areas. This is done today in midwifery, leprosy, and tuberculosis in Nigeria and is capable of extension into other fields. In this way, the doctor can be relieved of the load of merely repetitive work. However, such a policy presupposes well informed and imaginative supervision by doctors well educated and flexible in outlook. It also presupposes no lowering of academic standards at the medical schools of the country, which must provide the doctors who will be the backbone of the service, and capable

of dealing with ill-understood and novel situations and of conceiving and advocating enlightened health policies in their various fields. There is no doubt whatever that this latter attitude is the correct one. Whatever device is created for dealing with the sheer volume of health work, it must not be one which compromises the standards of university medical school education.

The life of the Faculty of Medicine has coincided with a period of breathless and inevitable political change. When it was formed, Nigeria was still under the colonial type of government, with very few Nigerians having effective say in their political affairs. Regional self-government came in 1953, and full sovereign status in 1960. In keeping with this, the College is seeking full university status in 1962, when the Special Relationship will come to an end. It is therefore a particularly opportune time to reconsider the whole question of medical teaching.

Nigeria has a population of about 37,000,000 and contains 15 per cent of all the people of Africa. It has a mean individual income of somewhat under £30 per capita, is mainly agricultural, and, while comparing well with other tropical countries, is not rich. It harbours all the common disorders which flesh is heir to, together with a great deal of conditioned malnutrition and most of the ailments listed in the index of any handbook of tropical medicine. It has about 800 qualified medical men and women at present or one to each 44,000 of the population. Up to the present, these have qualified abroad, with University College products now coming rapidly into the field. Clearly, the country cannot at present afford the ratio, common in Europe and the United States, of approximately one doctor to 1,000 of population; equally clearly, it cannot afford to limp along with its present numerically inadequate and ill-distributed squadron. What compromise between the medical needs and the financial resources of the country is possible?

In the latter part of 1960, the Ashby Commission published its report (2). This was a joint British/Nigerian/United States commission, set up by the Federal Minister of Education and financed by the Carnegie Corporation of New York, to estimate Nigeria's needs in higher education and related fields. The sections dealing with medicine are short and rather ambiguous in places, but they recommend a doubling of the output at University College and reorientating of the medical course to emphasize preventive medicine, and pediatrics. The policies are in line with the thinking of the Faculty at Ibadan, providing that no lowering of intrinsic academic standards is contemplated. A few days ago, the Federal Government published its statement of policy based on the Ashby Commissions advice in a Sessional Paper (3). The paragraph on medical training policy states:

> As regards Medicine, the University College Hospital at Ibadan will increase its facilities to enable it to admit a larger number of students and to increase its research facilities in the basic medical sciences. The University of Lagos will have a medical school and utilise existing medical institutions for training in clinical medicine. The University of Northern Nigeria will have a full-fledged faculty of Medicine by 1970. Every encouragement will be given to the Regional universities to establish teaching hospitals of approved standard. It is intended to produce about 400 doctors per annum from the year 1975. In order that the highest standard of professional competence may be maintained throughout the Federation a national professional body will be established to prescribe the minimum standard of medical education for admission to the Medical Register, the standard of post-graduate qualifications,

and the code of ethics to which doctors must conform.

In the light of this, it seems certain that the annual intake at Ibadan will expand to allow a graduation class of 100 per annum, with another school at Lagos of presumably similar size and possibly a basic sciences institute at Ibadan supplying both clinical schools. In any such expansion, the matter of securing staff of the necessary quality and diversity arises. To begin with the University College Faculty of Medicine was almost entirely European. This was not surprising, since the young African interested in academic medicine had no prospects of practising it and thus no incentive to enter it. The situation is now changing with alacrity. Two heads of departments are Nigerian, there are a number at the senior lecturer/lecturer level, about 50 per cent of senior registrars (residents) and practically all the house physicians and house surgeons are Nigerian. Almost the entire nursing staff of the hospital is now African. Even now, however, the list of applicants either African or from elsewhere is often small, particularly in certain specialties such as radiology, opthalmology and the various divisions of pathology. There is likely to be a place for the secondment of experienced teaching staff from foreign medical schools of repute, where English is spoken, for some time to come, although this method has as yet been used on a small (but profitable and encouraging) scale. It cannot however replace the body of permanent staff and these are hard to come by.

Apart from the in-service training of interns, there has as yet been little attempt at postgraduate training. It was felt that the first task was to get undergraduate training on a firm footing and then turn to postgraduate work. The intention is to provide a diploma course of not more than 3 months of a very practical character, which would pay attention to the broader medical, surgical, and obstetrical problems of the country and not only to parasitic diseases. Apart from this there is a body of opinion which feels that there is a great need for a short, intensive course of only 3–4 weeks for those trained overseas, orientating them on the major medical problems they are likely to meet in all fields of their work.

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International Assistance in Medical Education

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SUMMARIO

Sub le Conventiones de Rio (1942), effectuate per le pressiones del Guerra Mundial II, programmas bilateral de sanitate esseva establite como un medio de ligar plus intimemente le nationes del hemispherio occidental. Le exemplo date per le programmas de America latin resultava in supplicas ab le altere areas del mundo pro adjuta similar (e.g., Liberia, 1944; le Philippinas, 1946; Grecia e Turchia, 1947). Con le sancimento del "Plano Marshall" tal programmas se expandeva rapidemente. Desde alora, on ha recognoscite gradualmente que le medicina american offere un opportunitate unique in nostre programma de adjuta estranie de assister le paises disveloppante de crear servicios medical como un parte de lor total planamento socioeconomic. On ha date appoio considerabile al sanitate public, con emphase special super le aspectos strictemente preventive de servicios de sanitate. Nonobstante, le insufficientia de personal adequantemente maestrate in le major parte del paises disveloppante ha essite un grande handicap. Education medical, ergo, es un factor essential in programmas duccose de adjuta international, e durante le duo decennios passate le Administration de Co-operation International e su agentias precendente ha facite effortias substantial in iste direction. Un media de plus de 100 membros del facultate son apportate a scholas medical in le Statos Unite annualmente pro maestramento academic e pro instruction in le plus nove methodos de education medical. Scholas medical american, in plus de reciper iste practicantes, ha etiam contribuite grandemente per provisiones de consultores pro assignation ultramar de parve e longe periodos de tempore, e on ha establite 8 contractos con scholas medical ultramar pro programmas de maestramento medical de varie scopo (le scholas que participa son: Universitate Washington, St. Louis; California, San Francisco; Tulane; Buffalo; Indiana; Minnesota, e Stato Louisiana).

Under the pressures of World War II, the 21 Ministers of Foreign Affairs from the Latin American republics at Rio de Janeiro in January, 1942, formulated agreements establishing bilateral health programs as a means of tying together more closely the security and prosperity of the nations of the Western Hemisphere. Under these agreements, the Latin American republics resolved to improve health conditions within their own borders with United States technical assistance, and at the same time to assure that war materials vital to the Allies would become increasingly available as the general economy and the health of the workers improved.

Within the Office of the Coordinator of Inter-American Affairs there was organized in 1942 a government corporation—the Institute of Inter-American Affairs—to coordinate and administer these new bilateral Latin American health and other technical cooperation programs. In these programs, the United States became identified as a partner working directly with—not merely in or for—emerging countries, helping them to help themselves.

The examples set by the Latin American programs resulted in requests from other areas of the world for similar assistance—Liberia, 1944; the Philippine Islands, 1946; Greece and Turkey, 1947. With the enactment of the Economic Cooperation Act of 1948, the "Marshall Plan," such programs were expanded rapidly. Health programs were emphasized in Formosa, Indonesia, Burma, Thailand, Indo-China, and the Philippines. Aid to Korea was authorized in

Office of Public Health, International Cooperation Administration, Washington 25, D. C.

1950. The Technical Cooperation Administration was established within the Department of State (1950-53) in response to President Truman's proposal for a "bold new program" of cooperation with all underdeveloped areas in campaigning against poverty, disease, ignorance, and political instability. TCA and ECA operated concurrently for a period with little overlapping—the former in Southern Asia and the Near East and the latter in Europe and the Far East. On August 1, 1953, President Eisenhower combined all aspects of the Mutual Security program, including the Institute of Inter-American Affairs, into the Foreign Operations Administration, which was to be a temporary agency. In 1955, these functions were all combined in the International Cooperation Administration (ICA), a semi-autonomous agency within the Department of State.

From the earliest days, foreign aid has given considerable emphasis to public health, and within this discipline greatest support has been given to the strictly preventive aspects of health services. The high mortality rates occurring in underdeveloped countries have directed attention particularly to the control of communicable diseases, to environmental sanitation, and to various attacks upon the high infant and maternal death rates. The organization, construction, and operation of health centers have received continuing attention. In all these activities the program has developed through cooperative action with the Ministries of Health of the host countries.

The scarcity of adequately trained professional personnel in all these developing countries has been striking. In 1942, the Institute of Inter-American Affairs developed a fellowship program, and this has continued to be one of the principal activities of the technical assistance programs. During recent years, from 400 to 500 participants in the health sciences are brought annually to the United States for 1 or more years of training, chiefly at the graduate level. The Office of Public Health of ICA has entered into an agreement with the International Education and Exchange Branch, Division of General Health Service of the U. S. Public Health Service, to provide the placement and programming of these participants.

In 1952, after 10 years of operations in Latin America, an evaluation was made of the health programs of the Institute of Inter-American Affairs. The evaluation team emphasized that the quality of medical education in Latin America was not consonant with the best health and medical interests of their countries. They listed needed corrective measures as follows: (1) limitation in numbers of students; (2) selection of faculty members on the basis of teaching ability and scientific productiveness; (3) adequacy of physical plant for lecture rooms, laboratories, and necessary equipment, and appropriate hospital wards with workable relationships for their clinical use in teaching, and with suitable health department connections for teaching and social and preventive aspects of medicine; (4) availability of a good medical library; and (5) sufficient budget. The survey team pointed out the problem of the quantity vs. quality factor in medical education and the essential need for consultation, study, and planning jointly by the Ministry of Health, the Ministry of Education, and the schools of medicine in order that the product of medical education may be prepared to carry on the type of services needed.

Subsequent experience was that the findings in Latin America were in many respects applicable to medical education activities in other parts of the world

where the ICA programs were functioning and particularly in the Near East and Far East areas.

Since only a very small percentage of the required manpower could be brought to the United States for long-term training, it has been essential to initiate or expand facilities within the host country. Training for nursing, midwifery, nurse auxiliaries, and other groups of paramedical and sub-professional personnel has been relatively successful in many countries.

It therefore was abundantly clear that a new approach to foreign aid to medical education was in order. Incidentally, similar needs were developing within the foreign aid agency in such programs as agriculture, education, etc.

The decision to attempt to upgrade medical schools or to initiate new medical schools presented many more problems and difficulties of a much greater magnitude than in any other category of the health professions. Such problems as lack of adequate teaching laboratories, classrooms, equipment, teaching hospitals, deficiency of budgets, absence of full-time teaching faculty, lack of facilities for research, unlimited enrollment, no acceptable promotion policy, inadequate library facilities, frequent enrollment of part-time students, and student involvement or desire to influence administration of the medical school were noted. All seemed formidable roadblocks to discourage the ICA from initiating substantial efforts to radically improve any of the schools of medicine except through the granting of fellowships for study in the United States, or the provision of modest amounts of laboratory equipment, or minimal help to the library.

TRAINING

Furthermore, it became painfully evident that, after a few years of providing traineeships (participant support) in the case of medical personnel sent to the United States for graduate work in public health, the deficiencies in the basic preparation of medical graduates were a serious handicap in this year of academic study. Thus, while ICA's objective was to develop leadership for health services in the host country, we were being presented with the task of giving graduate training to many bright but inadequately prepared physicians. Medical education is of such long duration, and there is such severe competition to gain admission to a United States school of medicine, that essentially no participant training programs in undergraduate medical education have been possible.

The emphasis on bringing to the United States for graduate study nationals who would become key figures in ICA-supported projects within their own country has proved to be a useful device in providing technical assistance in medical education. The numbers of ICA participants programmed in medical education in Fiscal Year 1957 was 91 from nineteen countries; in FY 1958 there were 111 from 24 countries; in FY 1959 there were 150 from 23 countries; and in FY 1960 there were 190 from 24 countries. These staff members have spent from a few months up to 4 or 5 years of graduate and postgraduate study in the medical schools of the United States. Not only have they been provided the opportunity of pursuing professional studies within their chosen specialty, but emphasis has been placed upon their actual participation in the teaching of American medical students wherever possible. Scores of these young faculty people have already completed their training, have returned to their school, and now occupy key teaching positions.

USE OF MEDICAL EDUCATION CONSULTANTS

The earliest example of employment of a consultant in medical education by the Institute of Inter-American Affairs was the utilization of Dean Herman Weiskotten, Syracuse University School of Medicine, in 1944. At the request of San Marcos University officials, Dr. Weiskotten was sent to Peru in October, 1944, to make a survey of the medical school, and recommended improvements and changes. At the end of 2 months' study, Dr. Weiskotten presented his report, and, as a result of his recommendations, a number of changes were introduced into the curriculum.

Since that time medical education advisors have been employed by ICA and its predecessor agencies in Latin America on a regional basis, as well as for specific assignments at the medical schools of the University of San Marcos in Lima, Peru, and the University of El Salvador in San Salvador. Consideration is also being given to additional consultants in other countries, particularly Brazil.

In the Near East/Far East area, ICA medical education advisors have assisted the three medical schools in Taiwan; the Chulalongkorn and Sirraj Medical Schools in Bangkok, Thailand; the Faculty of Medicine of the University of Saigon in Vietnam; the Medical School of the University of Shiraz in Iran; and three schools in India—the All-India Institute of Medical Sciences, and the medical schools at Trivandrum and Hyderabad. Most of these advisors have been used for 2 years or more, and emphasis has been placed on the basic sciences and preventive medicine. Short-term consultants (6 months or less) have also been used, mainly in Taiwan.

As health programs in the African area develop, there will be need for greater emphasis on medical education. To date ICA activities in this field have been limited to short-term consultants such as the team which completed a survey for the new medical school in Ghana in the summer of 1960 and the survey of Ethiopia by the University of Utah. One of the major activities in the African area, however, has been the development of the Gondar Public Health Training College in Gondar, Ethiopia. This is a special project jointly sponsored by the Ethiopian Government, ICA, WHO, and UNICEF for the training of public health officers, community nurses, and sanitarians to staff the rural health units of Ethiopia. The public health officer must be a high school graduate and goes through a 4-year training program in curative and preventive medicine which prepares him for general medical practice and public health activities in the rural areas. This project was not conceived as a medical education project, but rather as a program to furnish minimal health care to the rural areas until such time as Ethiopia could develop university facilities and a medical school to furnish its own needs.

UNIVERSITY CONTRACTS

As interest in medical education projects as part of the foreign aid program has increased, ICA has turned to the American medical schools for assistance through the use of the university contract. These contracts may be directly between the American university and the foreign university, or between ICA and the American university to carry out a program in a specific school in accordance with agreements already reached by ICA and the host government. Such contracts vary considerably in scope and likewise in cost, but generally include the sending of American medical educators to the foreign medical school, funds for equipment and supplies for teaching purposes, and the necessary campus staff to support the field pro-

gram. Funds may also be included for the training of staff of the recipient institution, but usually this is handled through regular ICA channels working in close cooperation with the university contractor. Major construction costs for classrooms and laboratories are not included but have been made available, under special circumstances, through ICA funds outside the contract, such as the construction programs now being undertaken for the medical schools in Chiengmai, Thailand, and Saigon, Vietnam.

ICA frequently obtains the use of resources from outside of government by means of service contracts. These resources include management and organizational capability and skilled personnel. These make up for the lack of necessary resources within government, and also it is a policy to favor the use of nongovernmental organizations in the foreign aid program to the maximum extent possible. The university contract has been utilized where a broad program of assistance is needed to develop an entire medical school rather than a single department. Under this arrangement, assistance can be given in over-all medical school administration including selection and limitation of students, revision of curriculum, development of full-time departments, organization of new departments such as preventive medicine, as well as improved teaching techniques with emphasis on practical experience and laboratory work as compared with didactic lectures. Considerable emphasis has been placed on the basic sciences in these contracts, not only because of their importance in modern medical education, but also because this is usually the area of greatest need for improvement. Research is encouraged throughout the medical curriculum, but specific funds for this purpose in the university contract have until recently not been available. It is planned that, in the future, research funds will be available for research activities particularly oriented to disease problems of the area.

ICA and its predecessor agencies have developed eight university contracts with American universities and medical schools: Washington University, St. Louis; University of California in San Francisco (2); Minnesota; Tulane; Buffalo; Indiana; and Louisiana State. As the scope of the work of these contracts has varied considerably, and as some contracts had individual characteristics, a brief summary of each follows:

1. *Washington University School of Medicine, St. Louis, Missouri, and the Chulalongkorn and Sirraj Medical Schools of the University of Medical Sciences, Bangkok, Thailand.*—The first medical education contract of this type was developed in the early days of the foreign assistance program by the ICA predecessor agency, ECA. This contract was developed in 1951 directly between ECA and Washington University for the purpose of aiding in the development of the two medical schools in Bangkok which formed part of the University of Medical Sciences.

U. S. medical education advisors in both the basic and clinical sciences were sent to Bangkok for periods of time varying from a few months to two years to assist in improving the teaching through technical assistance and the furnishing of teaching supplies and equipment.

This contract was phased out and terminated in June 1954 by mutual agreement.

2. *University of California School of Medicine, San Francisco, California, and the School of Medicine of the University of Indonesia in Djakarta.*—One of the most successful of the university contracts has been the contract between the California and Djakarta Schools of

Medicine. It is an example of a medical education contract which has completed its plan of operations and actually terminated according to schedule.

Overtures for this contract affiliation were first made in 1951, and limited assistance was given to the Djakarta Medical School up until the signing of a contract between the University of California and the Ministry of Education of Indonesia on July 1, 1954. This contract was completely financed by ICA. Under the terms of the contract, an affiliation between the two medical schools was developed which involved the sending to Indonesia of 31 U. S. medical educators and six U. S. administrative personnel. The medical educators included specialists in the biological sciences, as well as the basic medical sciences and the clinical fields, with tours of duty varying from as short a period as a few months, up to 6½ years, but averaging more than 2 years in duration. Assistance was given to the medical school in the selection of students, as well as a reorientation of the examining system. A new 6-year curriculum was developed and applied on a year-to-year basis until each of the 6 years had been changed. Student enrollment was increased to a maximum of 200 the first year and 150 for each succeeding year, as compared with the 20 or 30 that previously had graduated. Large quantities of teaching materials and supplies were made available to the project, both by ICA and through the contract, for both the basic science and clinical departments. Items included laboratory equipment, textbooks, library books, audio-visual equipment, and administrative supplies for the 25 departments of the medical school, and amounted to slightly over $1 million in value. In addition, local currency funds were made available by both the Indonesian Government and the U. S. Government for the construction of new buildings and the rehabilitation of other buildings to improve the physical facilities.

Some 125 Indonesians received advanced training in the U. S. or some other country under ICA sponsorship, but their programs were developed in close association with both the contract staff in the field and the campus staff at San Francisco.

In addition to the contributions of ICA and the Government of Indonesia, the China Medical Board of New York also participated in this project, and actually California's Chief of Field Staff for the entire period of the contract was paid for by the China Medical Board. They also contributed supplies and equipment, particularly for the Department of Microbiology.

The contract was originally signed for a 3-year period and was subsequently extended and terminated on June 30, 1960. The total cost of this project, including participant training, from 1951 to 1960, was approximately $4 million, of which a little less than $2 million was allotted to the contract itself.

3. *University of Minnesota, Minneapolis, Minnesota, and National Seoul University, Seoul, Korea.*—In 1954 an overall university contract was developed between the University of Minnesota and ICA to assist the development of National Seoul University, Korea, in the fields of education, agriculture, engineering, public administration, nursing, and medicine. This is the only example of an ICA-financed contract of this type for over-all university assistance, which includes activities in the health field.

In the field of medical education, twelve consultants have been sent to Korea for an average of approximately 14 man-months each. These advisors have been in both the basic science and clinical fields and have also included hospital administration. Emphasis was

placed on curriculum revision, assistance in developing laboratory facilities, and improvement of teaching techniques.

Large amounts of teaching supplies and equipment were furnished through the contract, including laboratory equipment, library books, textbooks, audio-visual materials, etc.

In addition, approximately 80 Koreans associated with the medical and nursing schools were trained through the contract for varying periods of time.

In addition to this being a broad university contract, it also has two other characteristics which differentiate it from the other medical education contracts. The great majority of all the U. S. staff members sent to Korea came from the faculty of the School of Medicine of Minnesota, and the majority of the Koreans sent to the U. S. under the contract were trained at Minnesota.

The contract, initiated in 1954 for a 3-year period, has subsequently been extended and will expire June 30, 1961. The total cost of the medical and nursing component of this project from 1954 to 1961 is estimated at $1,450,000.

4. *Tulane University School of Medicine, New Orleans, Louisiana, and the medical schools of Colombia, South America.*—This contract was planned to give technical assistance on a very limited basis to all the medical schools in Colombia, although the contractor selected the medical school in Cali as its base of operations.

Representatives of Tulane visited Colombia in 1955 and participated in a seminar on medical education in Colombia. At the same time a contract was developed between ICA and Tulane which called for Tulane to give technical advice in medical education to the seven medical schools in Colombia. A senior faculty member was assigned to Cali and has been the only long-term staff member working on the project in Colombia. Numerous short-term consultants have been employed, mainly in the basic sciences, to assist Cali, as well as the other medical schools.

Accomplishments to date have included administrative reorganizations of certain departments in the schools along the lines of U. S. medical schools, stimulation and assistance in the organization of an Association of Colombian Medical Schools, curriculum revisions, assistance in establishment of new departments, when required, and stimulation of research.

Funds have also been used to purchase teaching supplies and equipment, but no funds were used for major construction. Training funds have been made available by ICA, outside the contract, for 21 Colombian medical educators to study in the United States.

The original contract was for 2 years and has been subsequently extended to May, 1961. Further extension of the contract is presently being negotiated. The total cost of the project from 1955 to 1961 has been approximately $300,000.

5. *University of Buffalo School of Medicine, Buffalo, New York, and the School of Medicine of the National University of Asunción, Paraguay.*—This contract is to assist in the development of the only medical school in Paraguay, and also includes assistance in nursing to the Nursing School of the Ministry of Public Health in Asunción, Paraguay. It is financed in a different manner in that the contract is between the University of Buffalo, the National University of Asunción, and the Ministry of Public Health and SCISP, a semi-autonomous health service which is financed by both the governments of Paraguay and the United States (through ICA).

Following a survey visit made by the Dean of the Buffalo School of Medicine and a representative of the Nursing School, a contract was signed in Novem-

ber, 1956, for limited assistance to the schools of medicine and nursing.

In the field of medicine, one medical education advisor has been in residence since 1956 to assist the National University in the broad aspects of medical education, including selection and promotion of students, rehabilitation of library facilities, improvement of laboratories, curriculum revision, strengthening particularly of the premedical year, and establishment of full-time basic science departments. During the first 3 years, emphasis was placed on the basic sciences, while concentration is now aimed at improving the hospital services. A third phase is planned to improve clinical teaching.

Two long-term advisors have been assigned, one in medicine and one in nursing, and short-term consultants have been used. Funds have also been used for laboratory rehabilitation and teaching supplies and equipment. Although some contract funds have been used for training, other Paraguayan faculty members have received in-service training by ICA and the Kellogg Foundation in cooperation with the contractor.

The contract was for 3 years and has since been extended to November, 1962, with the possibility of further extension. The total cost of this project for 1956–1961 has been approximately $300,000, for both medical and nursing activities.

6. *University of Indiana School of Medicine, Indianapolis, Indiana, and the Basic Medical Sciences Institute of Karachi, Pakistan.*—At the request of the Government of Pakistan, ICA entered into a university contract with Indiana University in 1957 to undertake the development of a Basic Medical Sciences Institute, located in Karachi, Pakistan, under the aegis of the Ministry of Health and Social Welfare, but in conjunction with the University of Karachi.

The purpose of this Institute was to train in Pakistan doctors as instructors and professors in the basic medical sciences to staff the nine medical colleges in Pakistan.

Under the terms of this contract, Indiana has furnished six U. S. professors in the fields of microbiology, physiology, biochemistry, pharmacology, anatomy, and pathology, as well as a medical librarian, a medical instrument-maker, and an administrative assistant. In addition to the long-term personnel, it is also contemplated that short-term staff members will also be utilized, particularly in the clinical sciences, for the purpose of relating the importance of the basic sciences to the clinical fields.

Nearly the entire first 2 years of the contract were spent in developing the physical facility for the Institute, and in installing the necessary equipment and supplies required for the basic laboratories. The Institute was formally opened in April, 1959, and graduated its first class in May, 1961. The students will receive a Master of Science degree from the University of Karachi, and most of them will be assigned to various Pakistan medical schools to teach in their subject of specialty. It is contemplated, however, that about eight of the recent graduates will be selected for further study in the United States, starting in the fall of 1961.

The Institute is housed in an independent remodeled building at the Jinnah Central Hospital in Karachi, is equipped to offer full modern facilities for classes, laboratory work, and research, and is equipped to operate as an independent unit with its own shop and maintenance facilities, as well as an excellent medical library.

The contract, originally signed in June, 1957, has since been amended to cover the period through October, 1962. The possibility of extension is now under consideration. It is estimated that the

total cost of this project will be approximately $1,800,000.

7. *University of California School of Medicine, San Francisco, California, and the School of Medicine of the University of Airlangga, Surabaja, Indonesia.*—As a result of the successful termination of the program in Djakarta, the Government of Indonesia requested similar assistance from ICA for the development of the medical school in Surabaja. Therefore in July, 1959, a contract was signed between the University of California and the Government of Indonesia, financed by ICA, to undertake this program. The scope of this project is similar to that of Djakarta, although a longer period of time will probably be required. Under this arrangement, it is contemplated that from five to ten U. S. medical educators will be sent to Surabaja on a long-term basis, with additional short-term visits as are deemed necessary. Approximately twenty Indonesians per year will be trained in the U. S. in the biological sciences, basic medical sciences, and in the clinical fields. Approximately $900,000 worth of teaching aids, textbooks, laboratory equipment, and supplies will also be furnished.

It is contemplated that this contract, under present circumstances, will be for a minimum of 6 years, starting in 1959, and may well be extended beyond that time. The estimated cost of the program is $3 million, of which $2 million will be allotted to the contractor, with the difference to be used by ICA for the training of Indonesian participants.

8. *Louisiana State University School of Medicine, New Orleans, Louisiana, and the School of Medicine of the University of Costa Rica, San Jose, Costa Rica.*—The University of Costa Rica developed a new medical school whose first class of medical students entered in March of 1961. ICA signed a contract with the LSU School of Medicine in 1959 to assist in the development of the new school through the assignment of U. S. medical educators. Training of Costa Rican physicians as teaching staff of the new school, laboratory equipment, library books, and other teaching supplies will be furnished by ICA in collaboration with the contract.

Although it is planned that some U. S. advisors will be sent to Costa Rica for a year or longer, so far only short-term consultants have been utilized. The contract was developed for a 3-year period starting in 1959, with the possibility of extension. Funding available for the 3-year period is estimated at $100,000.

In addition to the firm contracts noted above, ICA is currently negotiating with other U. S. medical schools for assistance to three additional medical schools:

(*a*) Chiengmai Medical School of the University of Medical Sciences in Chiengmai, Thailand.

ICA has been assisting the Government of Thailand since 1956 in the development of a new medical school for Thailand to be located in Thailand's second largest city, Chiengmai. Buildings for the new medical school are under construction, and auxiliary facilities have already been completed. The provincial hospital in Chiengmai was transferred to the University of Medical Sciences, and its bed capacity has been doubled from 150 to 300 beds. Construction is now under way for a basic medical science building, central hospital facilities for a 500-bed hospital, and 144 new hospital beds. The first premedical students were admitted in temporary facilities in Bangkok in the fall of 1958, but the school is now physically located in Chiengmai.

The Government of Thailand has requested ICA's assistance in the development of this school by means of a university contract.

(*b*) The University of Saigon School of Medicine, Saigon, Vietnam.

ICA has been assisting since 1956 the Government of Vietnam through the Ministry of Education in the development of the medical school of the University of Saigon. This school moved from Hanoi at the time of partition in 1954 and has since been occupying temporary quarters in Saigon. Plans are presently under way for the construction of a new basic medical science building to house the medical school.

The Vietnam government has requested continued U. S. technical assistance in the development of this school.

(*c*) The University of Shiraz School of Medicine, Shiraz, Iran.

The Government of Iran has been desirous for some time of making the University of Shiraz into an American-type university. The Iran Foundation, a private foundation incorporated for the improvement of health and education in Iran, has been working since 1947 in Shiraz on the development of a modern 250-bed hospital. Since 1957, this hospital has worked in close association with the medical school of the University of Shiraz, and many of the American medical staff of the hospital have also contributed their time to the medical school. ICA has assisted the Iran Foundation in this work through a direct contractual arrangement between the ICA and the Foundation. It is now felt that such assistance could be better given through a university contract directly to the University of Shiraz.

SUMMARY

Gradually it is being recognized that American medicine offers a unique opportunity in our foreign aid program to assist the developing countries in evolving health and medical services programs for their people as a part of their general over-all socio-economic planning. Medical education is one of the most important foundations in such activities. During the past two decades, the International Cooperation Administration and its predecessor agencies have devoted substantial effort in this direction. More than an average of 100 young faculty members per year are brought to United States medical colleges for academic training and for indoctrination in the newer techniques of medical education. American schools of medicine have made enormous contributions through receiving these trainees, through provision of short-term and long-term consultants for overseas assignment and in eight instances have established contracts with medical colleges abroad.

Medical Training in Poland

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SUMMARIO

Le systema actual de education medical in Polonia es considerate un resultato del cambios historic que occurreva in iste pais desde le medievo. Un grande rolo in su disveloppamento e tendentia actual se attribue al spirito progressive del medicos polonese del seculo decenovesime, qui, postquam su pais perdeva su independentia, esseva compulsate de studiar al extero; illes apportava noye ideas quando illes retornava. Iste es probabilemente proque le education medical polonese, in le secunde medietate del decenovesime seculo, portava un marca de medicina social que non esseva si evidente in altere paises europee. "Pensamentos e Aphorismos super Ethicas Medical," un travalio publicate in 1897 per W. Bieganski (un medico in un burgo provincial qui esseva autor de plure obras medical notori) monstra nettemente iste spirito. Un altere exemplo del precoce approche social de medicina polonese es le "Programma" publicate per alicun medicos de Warsaw in 1906, con le titulo de "Medicina e Auto-Governamento." Illo tracta de omne problemas de santitate public como un guida pro scholas medical, e es comparate con le "Reporto Flexner" lo qual illo precede per 4 annos. Durante que le restitution del Stato Polonese post le Gurra Mundial I contribuiva pauco a resolver le problemas de sanitate del pais (in 1939 Polonia habeva ancora uno del plus basse rationes medico/population in Europa) le plus grande reviviscentia de medicina polonese sortiva ex le cineres del Gurra Mundial II. In 1945 le Ministerio de Sanitate—nunc Ministerio de Sanitate e Bienesser Social—esseva create; illo ha essite in le processo de prender omne aspectos de servicios de sanitate e protection. Le emphase in cata uno de su activitates es super *medicina preventive*. Iste es etiam le orientation del 10 scholas medical (in plus un schola post-graduate, in operation desde 1953) cuje curso medical (nunc prolongate ab 5 a 6 annos, con 1 anno de internato) esseva designate pro vincer le difficultates causate per le secunde recolta del guerra. Le curriculo es uniforme pro omne scholas. Su contentos son similar a celle de le major parte de paises europee, lo qual pote esser vidite in un carta que compara le numero de horas assignate a cata subjecto. Le differentia es in le facto que le curriculo medical polonese es continuemente subjecte a reformas in accordamento con le requirimentos variante del sanitate e servicios social del pais que avantia rapidemente.

The present-day medical training in Poland is the result of (*a*) gradual changes of traditional forms of our medical studies of the Middle Ages and then of the 19th century, (*b*) the progessive, social spirit of our physicians who used to work in an enslaved country under political yoke and social oppression during the last century, (*c*) transformations due to the new political system in this country after World War II, when social health service has been introduced.

The first university was founded in Kraków, the former seat of the kings of Poland, in 1364. The 600th anniversary of the University and its Faculty of Medicine will be celebrated in 3 years.

At the beginning of the 19th century there were three Polish medical faculties already, the Warsaw academical Faculty of Medicine, founded in 1809, among them.

Polish medicine of that century was based on actually developing natural sciences, clinical observation, and efforts attained in morbid anatomy.

In the course of its partitions Poland lost its political and social independence. Thus, in the 19th century many Poles had to go abroad to study medicine, seeking hospitality at the universities of England, France, Switzerland Austria, Germany, and Russia. After graduation

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and practical experience in foreign countries the Polish physicians came back to Poland bringing along new ideas. Thus, views of all important European medical schools used to be represented in this country at that time. On the other hand, the Polish medicine of that time, particularly in the second half of the 19th century, bore a mark of social medicine. It was probably even to a greater extent evident in this country than in other European countries. The sad political and social circumstances of our nation contributed a great deal in that respect.

W. Bieganski, a physician living in the provincial town of Czestochowa, was a true picture of a physician with social and humanistic approach to medicine. In 1897 he published a volume "Thoughts and Aphorisms on Medical Ethics." W. Bieganski was a small-town doctor who working far away from any university centers, published 39 casuistic and clinical papers during 1883–1896. Among his publications was "Differential Diagnosis of Internal Diseases," a medical manual of 585 pages, having its second and third editions later on. In 1894 W. Bieganski published a work with no precedent in the world publicity of those times. It was "The Logic of Medicine," translated into German in 1909.

In his "Thoughts and Aphorisms," we read among other things: "Let him who would never be moved by human misery, whose character lacks softness and sweetness of approach, who is not strong enough to control himself in any circumstances, choose some other profession, as he would never make a good doctor." "Let the system of teaching medicine be reformed. It is not only your knowledge that counts, but also your heart . . . teach that the patient is not only a more or less interesting pathological case, teach that he also is an unhappy man, our fellow creature, teach not only by means of your words but by example of your own self. . . ." "They say: school gives knowledge, family brings up, but a physician teaches and brings up, at the same time a hospital and a clinic. Professors and persons in charge of hospital work should bear this in mind. Their students should not only be given knowledge but they should also be taught how to go on with the patient in a simple, human way. Let them remember that they are responsible for any bad habits of the physicians." "What is the source of ideals of ethics to be found by a physician? As a medical student a young man is a witness of idolatrous worship of knowledge, erudition and interesting cases in general and teaching hospitals, as a physician he encounters in practice a ruthless run for money, envy and fight for earning one's living. In such circumstances even the warmest soul must die out."

An example of a social approach of Polish physicians was a programme of activities, published by some doctors of Warsaw in: "Medicine in Self-Government," 1906. The programme of activities dealing with all problems of what is called public health now, included guiding principles for medical faculties, too. Those guiding principles are so characteristic that may I be allowed to quote some of them. They are especially interesting, since they were expounded before *the famous report of Dr. Abraham Flexner to the Carnegie Foundation for the Advancement of Teaching in 1910.* "Complete freedom of science and teaching is to be considered the only right device of a university. The only aim of that institution is social good." "It is the right and duty of a society to demand of the university solving any problems connected with the society's welfare and development." "We demand that the medical faculty council took into consideration the progress of science, mutual making up of individual chairs, improve-

ment of means and appliances of teaching." "No appropriate consequence is obtained from a lecture if it is limited to the very subject of the lecture only and no contact with other divisions of medical science is felt. An anatomist should remember physiology and the clinic and vice versa."

The authors believe that the scope of teaching the subject of anatomy should be diminished a little in favor of other natural sciences, particularly chemistry. "Besides—they say—biology, psychology, logic and philosophy should be taught at the medical faculty." They demand that history of medicine be taught in higher years of medical training. Moreover the authors postulate that, besides strict medical sciences, "nursing of the patient" and "medical-social sciences" be introduced to the curriculum. "We mean here"—they write—"social hygiene, medical statistics, epidemiology." "Living conditions and hygienic arrangements for the working and urban classes should be taken into account."

A great deal of attention is paid by that group of physicians to methods of training at the medical faculty; they demand that steps be taken and stress laid upon practical work in theoretical sciences. "Students themselves should prepare the most important divisions of the individual sciences." The chairs of the medical faculty should closely cooperate with one another. "It is the only way by which a theoretical lecture will reach its end, when in the mind of a doctor to be a certain general opinion arises which puts together every piece of information on various fields of the medical science." The students should be working at the patients' bedside during practical experience regarding clinical training. They should also work in the out-patient department and should go to see patients at home. The medical students should be divided into small groups in order to avoid: "too big a concentration of students handling too small a number of patients."

In the authors' opinion, a medical faculty should popularize knowledge in the society, "the state of health of the population should be a subject of analysis, advise on preventive measures or on organization of control of diseases should be given." The authors believe that the duty of a medical faculty is arranging "Courses for Physicians." They argue: "in view of rapid progress of medical knowledge, it is necessary to have an institution in each country, which could carry on informing doctors living far away from university centres on up-to-date efforts of medicine."

Closing their "plans of health service and of social health protection," the authors express their belief that "the most expensive hygienic arrangements would finally prove very economical as they decrease expenditures for organization of medical care and help to carry on work without any disturbances caused by the workers' illness which destroys the workers economically by costs of the cure, death, or by loss of possibility of earning their living." The authors show that, because of greater mortality rate in Polish territories (30 per mille as compared with 21 per mille in Germany in 1897), Polish society loses more than one million rubles a year; the authors stress the point that "any contribution to organization of medical care without funds for hygienic arrangements is just a wastefulness of public money." On the other hand, however, the authors say, that unless the whole of the population takes a conscious "part in such activities, the principles of promoting health throughout the country will be a failure." "Health of the population is one of the aspects of social life. Therefore advancement in that field must go on simultaneously with the general progress of

social life, therefrom a conclusion is drawn that rational economy has no right whatsoever to omit hygiene." "If, however, a close relation between various areas of social life is an undeniable fact, so also an undeniable truth is their dependence of economical conditions. The truth that poverty is the main foe of hygiene should never be forgotten."

That document is a quintessence of the experience gained in our Polish territories during the 19th century.

* * *

The restitution of the Polish State after World War I, unfortunately, has contributed little to the solving of those problems which our socially-minded physicians had been dreaming of. There were actually five medical faculties at our universities where students got their medical training; but there were evident trends trying to suppress the number of physicians. It was seen to it—as the argument went—that the doctors "state" must have not been pauperized in the least. It was argued that our country could not afford having more doctors. As a result of such a policy, in 1939 the number of physicians in Poland was one of the lowest, as compared with that of all European countries then. There were a little over 13,000 physicians in Poland, the index being 3.7 per 10,000 population, when the World War II broke out.

* * *

Poland of 1945 was a heap of debris, a picture of organizational confusion and chaos, a scene of great migration of peoples.

There were 6,000 physicians left in Poland. In relation to the population that managed to survive, there were even fewer doctors than before the war: the index of 1946 decreased to 3.2 per 10,000 population. The majority of hospitals were destroyed and plundered. The level of medical sciences stood still at the level of September, 1939. The production of drugs was negligible, production of medical equipment, not to speak of scientific appliances, was null and void.

In that heap of debris, along with the transformation of the whole social system in this country, social ideas of Polish medicine have revived. The reconstruction work began in this country. All social institutions were reorganized and reconstructed in order to execute the project of transformation of the country of considerably agricultural character (with its, to say the truth, backward rural areas), into an industrial country. It is to be added that 72.6 per cent of the population were rural in 1931.

In 1945 the Ministry of Health was created, which gradually took over all aspects of health protection, now directs the health service, and recently took over responsibilities in the field of social welfare, being now the Ministry of Health and Social Welfare. The Ministry sponsors preventive activity as the first plan job of the health service. There is a Scientific Council attached to the Minister of Health. Its members are professors of various fields of medicine.

The entire country is covered by numerous sanitary epidemiological stations and various curative-preventive establishments. In those institutions are working physicians trained in ten medical academies (so our university medical schools are called).

Creation of those ten medical academies helped to overcome difficulties caused by the aftermath of the war. The index representing the number of physicians in relation to the number of population has increased during the past 15 years. Although our population increased in number by half a million a year, the index is not far from ten physicians per 10,000 population, which means that there is one doctor for a

TABLE 1

SUBJECT	COUNTRY				
	U.S.S.R. 1957	GFR (a draft) 1959	Denmark (Copenh.) 1959	France (Paris) 1958	Poland 1958
Biology	190	120	....	111*	120
Physics	136	120	36	167§	150
Chemistry	140	180	250	62*	225
Anatomy	392	500	757	645	435
Histology with embryology	182	145		172	150
Physiology	247	400	200	104	165
Physiological chemistry	295	300	234	104	210
Hygiene	162	80	136	104	135
Microbiology with parasitology	207	75	100	164	150
Morbid anatomy with physiopathology	347	330	224	170	330
Pharmacology	170	135	108	144	165
Internal medicine with physiotherapy	1013	450†	1158	1056	930
Surgery with urology, orthopedics	1069	415†	1240	926	825
Gynecology & obstetrics	379	300†	356	306	480
Pediatrics	166	300	269	288‡	210
Radiology	within intern.	60	70	....	90
Ophthalmology	80	75	60	144‡	60
E.N.T.	108	75	66	144‡	60
Dermatology & venerology	101	75	86	144‡	90
Psychiatry	90	75	210	72‡	90
Neurology	106	75	136	144‡	90
Legal medicine with deontology	100	45	72	70	105
Organization of Health service	125	....	....	....	within hygiene
Infectious diseases with epidemiology	214	....	62	144‡	105
Social sciences	390	....	....	....	60
Relation of lectures to practical work	1:1.9	1:1	1:0.8	1:2.2 (plus 1 year house phys.)	1:1.8

* Preliminary PCB training.
† Plus hospital practice during summer holidays.
‡ Clinical stage.
§ Together with PCB training.

little over 1,000 population. We are trying to increase that number in order to meet requirements of up-to-date health service and health protection.

To begin with, medical training used to require 5 years. For the past few years the medical students have been taking their training for the period of 6 years. For a year they have been obliged to undergo a year's practical experience (internship). To become a specialist, a doctor must be employed in the profession for 6 or 7 years and then pass special examinations (residency).

Since 1953 a postgraduate school has been in operation. That school has been subordinated to the Warsaw Medical Academy, and first of all it trains doctors coming from the provinces. The training comprises all fields of medicine and is carried out mainly at 3- to 4-month courses. There are also short courses organized sporadically. In the school year 1959/1960 there were 1,385 doctors attending 3- to 4-month courses and 1,081 attending the short time ones; among that number, 350 country doctors were trained.

In our medical academies there are 470 chairs, 536 professors and docents, 4,162 adjuncts, senior assistants, and assistants. All of them are employed full-time.

Medical academies are the most prom-

inent medical centres in this country. Directly connected with our social health service system, they are vital points of the net of our health institutions. Besides didactic (physicians, dentists and pharmacists are trained there) and therapeutic work, the medical academies are important scientific research centres. They are—I would like to stress this point—schools of university status. "sister schools" of our universities. Because of their close contacts with teaching hospitals, former medical faculties, forming parts of the universities, became as if a sort of parasite living on the university's budget at the cost of other faculties; they became giants, distorting the usual proportions of a university school.

One could ask whether separation of medical and pharmaceutical faculties from the universities and creation of separate medical academies, subordinated to the Minister of Health, have not influenced the course of training and caused breech of contact with other universities. The Law on higher schools in this country concerns every school of university status—i.e., universities, medical academies, polytechnical schools, higher economical, agricultural and pedagogic schools, as well as the Academy of Physical Training. There is one common General Council of Higher Education whose members are professors of schools concerned. Two-thirds of the members are elected by the schools themselves, one-third of them are nominated. The Minister of Higher Education acts as President of the General Council. The Council gives opinions on all matters connected with activities of the schools in respect of science and teaching. In this way uniformity of dealing with all questions concerning higher education and higher schools of various types, has been secured.

On the other hand, young assistants who have been trained at medical academies, are a criterion of professional level of those schools themselves. Those young people who go abroad for further training within various fellowship projects, show not only abilities of their own but also a sound knowledge attained during their medical training. WHO Regional Office for Europe and the Rockefeller Foundation express favourable opinions on the Polish fellows. Heads of medical centres, responsible for the training of our fellows, who many a time are world-famous scientists, write to us proposing prolongation of fellowships because of the excellent work done by our doctors there. Such facts are not limited to a small number of fellows, since for the last 5 years more than 1,000 young scientific workers have been sent abroad for study.

Primary and secondary school training took 11 years. It now lasts 12 years. Although secondary education improves every year, we are not satisfied with it so far. The young people entering higher schools, although duly equipped with their certificates, are insufficiently mature yet. Addition of 1 year's training will probably help to improve that situation.

A candidate for the first year of medical training must pass a competitive entry examination in biology, physics, and chemistry. Probably this method of examination will be changed as soon as it proves unsatisfactory. Some of our medical academies try to improve the manner of selection. There were 238 candidates for the 100 positions in 1960. It can be observed that the number of candidates for medical training is smaller than it used to be. Women comprise over 50 per cent of the first-year students. It is to be pointed out that women generally have better marks at entry examinations and are harder working students than men are. How-

ever, the majority of assistants are men. Nevertheless, there are several women professors at our medical academies.

General medical training takes twelve semesters and is carried out according to a uniform curriculum laid down by teams of professors of the General Council of Higher Education. Into the curriculum are included disciplines encountered in the majority of European medical faculties. The number of hours in various disciplines at our academies, as compared with that in other countries, will probably illustrate the question best.

In trying to improve the course of training, we believe that contemporary efforts and developmental directions of the medical sciences must be reflected in medical training. At the same time, training must go in line with requirements and possibilities of the social health service, whereas aspects of human health protection must be considered to the full. Therefore, medical curricula should vary according to actual standards of living and working conditions observed in various countries. Curricula have to consider also specific conditions in which the doctors-to-be shall be working.

All elements considered above already, i.e., (*a*) progress of science, (*b*) living conditions, (*c*) working conditions, (*d*) organization of health protection, (*e*) structure of health service, are variable elements. They develop and advance constantly and rapidly these days. That fact calls for constant adjusting the curriculum to actual situation and also introducing into it obvious developmental trends. We cannot forget that the student of *today* will be working in his profession *tomorrow*.

A basic postulate is drawn therefrom which is going to be dealt with according to our possibilities and conditions. The members of the teaching staff must be scientific workers themselves, their knowledge must reach the world science level, they should be aware of current developmental directions of medicine; at the same time, they have to be in a close touch with the social health service. They have to be aware of real conditions of the social health service for which they train the doctors. They must be social-minded.

Taking into consideration the results of work done by our medical academies, we have the right to say that this aim has been reached by means of including our medical academies into the system of work of the Ministry of Health.

We are not infatuated therewith. I have allowed myself to point out the positive side of our medical training system, which is closely connected with the social health service, I would like to say that I do not wish to imply to anybody that we are free of errors and faults. We are trying to correct our errors. There was a period, during the past 15 years, when young doctors, after 5 years of training, had to go to independent work. Today the medical training lasts for 6 years, and our medical schools are obliged to do their best to give their students a sound theoretical knowledge in basic sciences of medicine, full preparatory training in basic clinical sciences (internal medicine, pediatrics, surgery, obstetrics) and also supplementary general education (social sciences, philosophy etc.) Leaving the medical academy, a young doctor will go for a year's training—postgraduate practical experience, where he will learn how to apply in practice his knowledge obtained in the course of his medical training. Afterwards he will be working under the experienced supervision of a senior doctor to get his specialization.

All measures in relation to medical training are taken with deep consideration of protection and promotion of the health of our population.

Medical Education in Denmark

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SUMMARIO

On essaya de comprehender tendentias e movimentos presente in le education medical in Danmark hodie. Etiam si iste studio se basa super compilationes de datos statistic official, le autor (Director del Instituto pro Recerca Experimental in Chirurgia, Universitate de Copenhagen) insiste super le puncto que su commentos non representa necessarimente un puncto de vista official. Le duo scholas medical danese (in Copenhagen e in Aarhus) son del typo universitate con instruction que se centra circa un maestro conferentista. In 1960, il habeva 1,832 studentes matriculate in le Universitate de Copenhagen e 984 a Aarhus (on expecta duo vices iste numeros ante 1970). Le principios guidante que subjace education medical in Danmark son de fornir al studente un fundo solide pro maestramento additional e pro travalio futur como medico sin reguardo a ulle division special del profession que il pote eliger plus tarde. On non expecta que un studente acquire cognoscentia complete de omne spheras de medicina ma que ille ha cognoscentia del principios fundamental e del methodos scientific. Le curriculo e le systema de examine, describite in detalio, reflecte iste vistas a un grande extento (le curriculo ha essite revisite 3 vices desde 1912, le ultime in 1954). In annos recente, le crescimento rapide de medicina e le specialisation intensive ha resultate in le addition de nove spheras al curriculo, e etiam si le longor requirite del curso medical ha remanite le mesme, illo vole decir 7 annos, un analyse statistic del real tempore passate in scholas medical monstra nunc un media de 8.6 annos. In un evalutation critic del curriculo de 1954, que pareva recentemente in le periodico "Le Studente Medical," on prefere instruction in parve gruppos in vice del systema traditional de conferentia. Iste es etiam un ressource pro accurtar le periodo del curso medical. Nonobstante, le numero del personal docente es ancora insufficiente a un tal cambio. On require un internato de un anno ante que on accorda licentia a practicar. Maestramento hospitalari in Danmark seque un parentato traditional de maestro-apprentisse. Maestramento post-graduate suffre a causa del dinder del hospitales in unitates separate e a causa del facto que multe activitates del programmas existente de maestramento son confidite tro al initiativa e responsabilitate del studente ipse. On discute alsi in iste reporto le organisation de institutiones de recerca medical e como on los financiar.

INTRODUCTION

The request for an article to this journal reflects interest in our country and in our university standards, and this is greatly appreciated, of course. To present a survey of recent development in medical education, medical research, and medical care in Denmark is, however, an overwhelming task for one man. No one can cover more than his own field efficiently today. The risk exists that important trends and features in other fields are neglected. Another risk lies in one's tendency to favour personal views rather than to deal objectively with valuable contributions by others. In addition, the description of a system and the transfer of its terminology into the language of another country carries some risk of leading to misunderstandings.

After some hesitation I decided to take on the task, since it is better to do something than to do nothing. The presentation does not represent an official statement on medical education in Denmark. It is merely the writer's attempt at comprehending trends and events and applying this in the description of the educational system. It is a compilation

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of officially available data, but the comments carry no more authority than given by the reader's acceptance or refusal of the ideas behind. My own engagement in surgery and surgical research has perhaps resulted in ideas and points of view strange to or at least not in accordance with those of people engaged in other fields of medicine. I apologize if this should influence my handling of nonsurgical aspects of the problems of medical education.

As to the approach, several points of attack exist. To my mind the searchlight should not merely be directed toward the organizational pattern and needs but toward the human aspects as well. They are essentials in today's attempts at meeting the population's need for thorough medical care. The important questions today are how to attract the able student to medicine and how to make a good doctor of him. Still another problem has appeared over the horizon in recent years: how to make sure that he will remain of sufficiently good standard and in keeping with the rapidly advancing potentialities of the medical sciences.

Denmark is a small country, and medical education has been strongly influenced by moves in greater nations. It is easy to trace ideas pointing to the systems of countries at times when they represented the creative forces of the world.

According to a classification by Flexner (5) the Danish medical school is of the university-type with instruction centered around a lecturing teacher. The curriculum is in accordance with the general principles of university education. Students are admitted under regulations valid for all sections of the university.

History of the university.—The Danish universities are two in number, one in Aarhus (Jtuland), founded in 1928, and one in Copenhagen (the island of Zeeland) established in 1479. Only minute differences exist between the instruction given at the two universities. In this presentation they will be considered identical. The traditions of university training have been established throughout the centuries by the activities of the Copenhagen University (1, 8).

The number of students at the two universities are, in the academic year beginning September, 1960: Aarhus, 2406, out of which 984 attended the medical faculty; Copenhagen, 6697, with 1832 students under the medical faculty.

The university of Aarhus was established in 1928. The increase in the number of students without similar increase in the number of teachers at the Copenhagen University was the impetus to the new establishment in Aarhus. It has ever since been rapidly growing and gained a reputation of its own. Apart from a medical faculty and a theological faculty it has a faculty of law, a faculty of economics, and a faculty of natural sciences.

The University of Copenhagen was founded by the king (Christian I), who was granted the necessary authority in a Papal Bull of June 19th, 1475, to the archbishop of Lund (in Skane, since 1658 part of Sweden, but at that time the seat of the archbishop of Denmark). It was established as ɛ schola universalis, with four faculties, like so many of the other European universities. It was given its own charter, and the scope of activity was confined to scholastic theology and the Canon Law.

In 1537 the reformation resulted in a new constitution and an ample endowment of church property confiscated during the reformation. A new and more practical charter was granted in 1571. Later new buildings were erected (1601), new regulations drawn up (1621), and the number of teachers increased. Large-

scale reforms were introduced after the great fire of Copenhagen in 1728 when nearly all the university buildings were destroyed, including the library with all its collections. The buildings were restored, and toward the end of the century the capacity of the university was increased.

The first half of the nineteenth century brought new difficulties due to the engagement of the country in the Napoleonic wars. The last half of the century meant, however, a period of rapid progress which continued during the period of the nineteenth century although at changing rates of intensity. During World War II and the German occupation, the public teaching and lectures were discontinued. The post-war period has allowed for steady increase in the activities of the university.

School education leading to the university.—Children start school at the age of 6 or 7 years. Primary school lasts 5 years. Up till 1903 two separated educational systems existed as in most European countries. One was represented by the elementary school providing primary instruction for the general population, the other by the old Latin school offering an academic education and leading, in the case of the ablest pupils, to the university. The Secondary School Act of 1903 linked the elementary and the academic school together by admitting to secondary education children between 11 and 15 by means of an entrance examination. Following 4 years in the secondary school the youngsters could either enter the line called Real (aiming at an education particularly suitable for practical life like office or business career etc.) or the line called Gymnasium (the direct preparatory school for university training).

A new education act was introduced in 1958 (7). Primary education will take place in town and country through a 7-year comprehensive school. Opportunity exists for differentiated instruction in English, German, and mathematics during the sixth and seventh year. Continued education will continue for 2 more years until a public examination is given, the result of which will determine whether the child should proceed to the Real exam (one more year) or enter the 3-year Gymnasium (preparatory to university education). The instruction given during these 3 years will be organized in lines as previously, according to main biases given to the divisions in the course. The subjects of instruction will include religion, Danish with Swedish, English, German, French or Russian, Latin, Greek (in the line of classic languages) history, geography, biology, philosophy, and, with emphasis on natural sciences, physics, chemistry, and mathematics (Table 1). At the end of the third year a public examination (studentereksamen) leads to the certificate of education, which admits to the university.

How this new system is going to work itself out nobody can tell. During the negotiations on the new act it was argued that, without a thorough preparation like that of the examination middle school of the previous system, it will be hard to maintain standards of the Gymnasium course. The old system provided for thorough selection based on qualifications and abilities demonstrated at examinations. The new leaves the selection primarily in the hands of the staff of teachers, and their judgment will rest on an evaluation of the day-to-day work. It is to be expected that the future students matriculating at the universities will present themselves with qualifications different from those of previous generations. It remains an open question whether this is going to influence the future trends in university instruction. It has been pointed

TABLE 1

THE UNIVERSITY-PREPARING SCHOOL.

Standard Time-Table (hours pr. week) for the Danish Grammar School, consisting of a four-year junior department ("middle school")—age group 11/12–15/16, and a three-year senior department ("gymnasium")—age group 15/16–18/19, which is divided in 2 main lines, "modern languages" and "science line."

					GYMNASIUM					
					Modern language line			Science line		
CLASS	MIDDLE SCHOOL 1.	2.	3.	4.	I.	II.	III.	I.	II.	III.
Religious knowledge	2	2	2	1	1	1	1	1	1	1
Danish	5	4	4	5	4	4	4	4	4	4
History	3	2	3	2	3	3	4	3	3	4
Ancient literature and art					1	1	1	1	1	1
English	6	3	3	3	5	6	5	2	2	
German		5	4	4	5	4	4			
French					5	5	4	5	5	4
Latin				4*	4	4	3			
Geography										
Nature study	2	2	2	2						
(mostly zoology and botany)	2	2	2	2						
General science†					2	2	4	2	2	4
Physics (and chemistry)	2	2	2	2				6	6	6
Mathematics	4	5	6	7				6	6	6
Physical education	4	4	4	4	4	4	4	4	4	4
Writing	2	1	1	1						
Drawing	2	2	1	1						
Singing (and music)	2	2	2		2	2	2	2	2	2
	36	36	36	38	36	36	36	36	36	36

* Obligatory only for those pupils who are candidates of the language line of the gymnasium.

† This subject includes biology, physiology, geography, astronomy, and—for the language line—some elements of physics.

[From: Brøchner-Mortensen: Medical Educaion in Denmark, 1959.]

out that the children between the ages of 11 and 15 are not given courses appropriate to their individual intelligence, diligence, and interests. The children of more than average standards will be suffering from this lack of attention, and they will not have the benefit of being prepared over a number of years for the academic education.

The system will have to be given the test of time. At present we will leave it at this with the words of *Willis Dixon* (1958) (4): "A fresh start is being made to provide a Danish school-system appropriate to present needs and in accord with the social and political temper of the times."

The university education in general. —It is considered the aim of university instruction and education to give the students knowledge and maturity. The transition from school to university offers difficulties to many students. The instruction given is not supposed to cover the entire syllabus of the examinations within the various fields or disciplines. The undergraduate's ability to plan his studies and to work on his own is of paramount importance for successful achievements in an academic career. The instruction given should introduce the student to a methodical scientific approach and offer him the guidance necessary for the study of his topic. The academic education should tend to give him independence in thinking and approach as a foundation of his work. This represents the traditional view. Within disciplines of technical or other practical implications a steady increase in content and scope of knowledge has taken place. It has become a prob-

lem today whether this maturation offers the opportunity of acquiring sufficient knowledge within reasonable time limits. Medicine represents a discipline in which this has become a major concern.

The university instruction is given by lectures or by group instruction. The lectures aim partly at giving the students information and knowledge supplementary to existing textbooks partly at focusing on particular aspects of a topic. A lecturer may deal in detail with fields of research in which he himself has been engaged. By group instruction the number of participants is limited. It has the form of the tutorial instruction based on discussion with the participants or they are submitted to examination. In this way the students may become acquainted with the teacher's personal method of examination and his approach to the problems of the field.

The degree exam is an essential feature of the Danish academic system. It represents the gateway to the professional career. This is a result of tradition. The examinations are in part oral and in part written. The examining boards include the member of the university staff in charge of the particular field, which the examination covers, and two examiners not involved in the university teaching. They are appointed by the ministry of education. The oral sessions of an exam are open to the public. Marks are given, and the old Latin terms, *laudabilis prae ceteris, laudabilis,* etc., are still in use. They are given numerical values so that the result of a degree exam may be given in points too.

The academic year begins September 1 and falls into two semesters or terms, the autumn term from the first of September to the first of December, and the spring term beginning the first of February and ending the first of May. During the months of December, January, May, and June the examinations take place. These months may be used by the students for taking part in practical work and training.

Generally speaking the participation in the university instruction is voluntary, and the students may plan their studies as they wish. The candidate may present himself for an examination at the term when he considers himself ready for it. Certain regulations exist as to the maximum intervals between various parts of a degree exam. A student may not have the opportunity of attending lectures because of paid work during the day or other personal matters. Still, personal work and study should enable the student to acquire sufficient knowledge for presenting himself for examination. Certain courses are made compulsory. In some fields no final examination is required. Instead the course ends with a test, written or oral. In other fields the student will have to be tested as to his elementary erudition before he can enter more advanced areas of study.

It is a general rule that no particular sets of books are required for the studies. It does not matter from where the student has acquired his knowledge as long as he has understood the essentials of the subject. The requirements may be covered by a great variety of textbooks. Recommendations are given and advisory pamphlets issued pointing to periodicals or monographs considered to be valuable supplementary reading.

University education is in Denmark free of charge. No tuition fees exist. Small fees are charged for participation in some courses. In medicine, for example, the total amount payable during the 7 years is 3–500 Kr. The students have to buy their own books. The students' reading room in the university library has an ample supply of the generally used textbooks available. They may be used free of charge.

May these remarks on university education in general serve as a background for the description of the medical education and some comments given below.

The medical curriculum and the requirements in medical education.—In the pamphlet advising the students how to approach the study of medicine it is stated that the curriculum should furnish the student with a solid background for additional training and future work as a doctor without regard to the branch of the profession in which his future service is going to be. To this is added that it is not to be expected that a student should be able to acquire complete knowledge of all fields of medicine. The medical training calls for the acquisition of a good deal of theoretical knowledge. It is essential for the student, however, to familiarize himself with the fundamental principles and the scientific method. It is of value for the student to train his ability to systematic observation and critical analysis. Similarly, thorough evaluation and synthesis of observations made should be exercised.

The medical training is on a voluntary basis as outlined in general for university education. Examinations represent the only means of assurance that the student has qualified himself sufficiently for the practice of medicine and surgery. As the field of medicine has been growing it has become necessary to introduce a number of compulsory courses ending with oral or written tests in order to keep the number of final examinations on a reasonable level. Similarly it has become a necessity to make participation in clinical work compulsory.

The degree exam consists of two parts. Part I is taken 3 years after admission to the university, and Part II 4 years after Part I according to the plan laid out for the students by the faculty. The periods of time given represent what is required for the average student spending all his time on the medical studies.

By tradition the Part I examination includes fields like anatomy, physiology, and biochemistry. In anatomy the examination comprises a practical test, based on the recognition of structures in predissected specimens and in histological slides, as well as an oral examination covering systematic and topographic anatomy and histology. In physiology, as well as in biochemistry, an oral examination is given. In addition, a written examination is required covering both fields.

To help the students acquire the knowledge necessary to fulfill the requirements, lectures are given by the teaching staff. Instruction is also offered as group instruction. In physiology a compulsory course in experimental physiology is required. Similarly, a laboratory course is given in biochemistry. In anatomy courses in dissection are partly given under an exchange program with other universities (German, French, and British), since sufficient material is not available in the country anymore.

Physics and general chemistry are considered of fundamental importance for the understanding of biochemistry and physiology and also for the handling of instruments and medical equipment. The knowledge acquired during the preparatory schools is not considered sufficient. Thus, additional, partly compulsory courses are given in these fields within the first year after admission to the university. The line in preparatory school (Gymnasium with natural sciences or languages) determines the extent to which the student is requested to take courses in physics and chemistry.

Similarly, it is considered essential for the students to have a general idea of biology and its medical aspects. A course in genetics and medical statistics serves

this purpose. It has to be taken within the first 2 terms at the university.

In addition to the medical instruction the students have to take an examination covering history of philosophy, logics, and psychology. They attend lectures on these subjects during the first two terms at the university. In this way they should study and make themselves familiar with general aspects of science and the traditions of investigative work. This basic education is required of all students admitted to the university independent of the faculty at which they have matriculated.

The Part II examination covers the disciplines of medicine listed below. *Oral examinations* are required in general pathology including bacteriology, in pathological anatomy and histology, in pharmacology, in obstetrics and gynecology, in forensic medicine, in general medicine, and in general surgery. *Written examinations* are required in hygiene, in general medicine, and in general surgery. *Clinical examinations* are required in medicine (in this is included neurology and epidemic diseases), in surgery (neurosurgery and orthopedic surgery are included), and in pediatrics.

The instruction offered to the students covers a 4-year period. It comprises lectures, group instructions (ten to fifteen students) as well as practical clinical exercises. In addition, it is required that the students spend some time on the hospital wards. This time is spent in the capacity of clinical clerk.

The number of hours assigned to the various disciplines have been set out in Table 2. The distribution throughout the various terms between Part I and Part II examination will appear in Table 5. It has been attempted to work out the curriculum in such a way that the students are forced to study the essential and major topics at the same time. This should allow for better syntheses of the knowledge acquired from the various fields. In this way the study of theory and the gain from practical work should go hand-in-hand.

There is not much to be said on the topics for written or oral examination. The scope and content of the themes correspond to those of other countries. General pathology includes bacteriology, and a course is given in inoculation technique. A course in blood grouping and transfusion technique is also given. Pathological anatomy includes histopathology and autopsy technique. Hygiene and social medicine as well as medical jurisprudence call for special courses. Pharmacology teaching includes a course in the technique of prescribing remedies, and issuing prescriptions. Lectures form the bulk of the instruction given on those topics leading to oral examination.

Clinical examinations are required in medicine, in surgery, and in pediatrics. It is obvious that clinical instruction is an essential part of medical education.

As a part of the degree exam the clinical examination session aims at testing the candidate under conditions similar to those he will be facing in a hospital ward or in a private office. Prior to the examination proper the candidate is allowed to spend three-quarters of an hour talking with a patient, taking the patient's history, doing the physical examination and the more elementary laboratory tests which he might consider necessary for the diagnosis. The idea is that the candidate should do in detail what he will have to do when his future patients come to his office. Next follows the examination session proper. The candidate gives the history of the patient and his findings on physical examination to the examining board. Usually the patient will be present up to this point allowing the examiners to check the findings of the candidate. Afterwards the examiner will discuss the findings,

TABLE 2
THE CURRICULUM OF THE MEDICAL SCHOOL OF COPENHAGEN

DISCIPLINES	LECTURES	SEMINARS	DISTRIBUTION OF HOURS: Laboratory work, techniques, etc.	DISTRIBUTION OF HOURS: Clinical clerkships	TOTAL
Anatomy including histology	72	504	181	....	757
Physiology	60	88	52	....	200
Biochemistry	96	90	48	....	234
General chemistry	72	106	72	....	250
Physics	36	....	....	....	36
Genetics and medical statistics	12	24	....	....	36
Internal medicine	264	168	14	688	1134
Surgery	348	156	....	688	1192
Pediatrics	72	72	....	125	269
Obstetrics and gynecology	60	48	48	200	356
Pathological anatomy	92	96	36	....	224
General pathology including bacteriology	60	....	40	....	100
Pharmacology	84	24	....	....	108
Psychiatry	60	....	....	150	210
Neurology and neurosurgery	36	....	....	100	136
Dermatology	12	24	....	50	86
Epidemiology	12	....	....	50	62
Ophthalmology	24	36	....	....	60
Otology	24	36	6	....	66
Orthopedic surgery	24	....	....	....	24
Physical medicine	12	....	....	....	12
Hygiene	84	....	16	....	100
Forensic medicine	72	....	....	....	72
Radiology	36	32	....	....	68
Anesthesiology	24	....	....	....	24
Clinical chemistry	....	....	12	....	12
Medical genetics	12	....	....	....	12
Total:	1760	1504	525	2051	5804

[From: Brøchner-Mortensen: Medical Education in Denmark, 1959.]

the diagnostic problems, supplementary methods for obtaining the final diagnosis, the methods of treatment, and the prognostic aspects. In surgery it is required that the candidate gives a short description of the operative procedure if surgical intervention should be advised. In this way an attempt is made to evaluate the candidate in the capacity of a doctor responsible for that particular patient. He must apply his theoretical knowledge to the handling of a specific case.

This type of examination calls for certain amount of practical experience in ward work. The introduction to the work with patients is accomplished in a stepwise fashion.

The hospital service starts immediately after the Part I examination and lasts for 6 months. Three months are spent in medicine and 3 months in surgery. The students assist the interns and residents on ward rounds. Instruction is given in the technique of taking a history from the patients and in record-writing. Instruction is given in the technique of doing the physical examination on a patient, including the stethoscopical examination. The instruction is given by tutors, who are senior assisting physicians or surgeons of the hospital. When serving in surgery the students are instructed in operating room technique. They are in addition given the opportunity of assisting at operations. This

means to the students the only way of becoming acquainted with the practical aspects of surgical technique today. Exercises and special instruction in operative surgery were abandoned in 1939.

Next step in clinical instruction is the attendance of clinical classes given by senior staff members in medicine and surgery in the municipal or other hospitals in the city. Fifteen or twenty students are assigned to a clinical professor of surgery or medicine. This group instruction is covered in one term.

The third step of the clinical instruction calls for participation in work on the wards assisting interns and residents in taking history and physical examination when new patients are admitted to the hospital. This gives the student the opportunity of participating in emergency operations and in all types of treatment of acute conditions. Furthermore, the curriculum calls for 1 month of service in an out-patient department in medicine as well as in surgery. In recent years arrangements have been made for students to serve in a similar assistant capacity in the office of a general practitioner.

In many hospitals the need for interns and assistant residents is often difficult to meet during summer and vacation periods. Quite a few students have benefited from this. They get the necessary months of clinical service covered at the same time as they receive the payment from the job.

Special courses are given as indicated in Table 8. In dermatology and venerology, in ophthalmology, in otorhinolaryngology the courses are concluded with an oral test. In psychiatry a written test concludes the course. Patients from the fields of epidemiology or neurology may be used at the clinical examination in medicine as orthopedic or neurosurgical patients may be given at the clinical examination in surgery. These courses are based on lectures as well as on clinical exercises.

Comments on the medical curriculum.—The rapid growth of medicine and the intensive specialization have resulted in the adding of new fields to the curriculum in recent years. The period of time advised as necessary has remained the same, 7 years. However, a statistical analysis of the time used by graduates from the years 1952 through 1957 shows, that 8.6 years is the average length of time spent on medical education by this group. Furthermore, these statistics give as a fact that as few as 10–11 per cent of the graduates had completed their studies and graduated within the 7 years given in the curriculum (Brøchner-Mortensen & Arne Nielsen, 1958) (3).

As mentioned above university degree exams are the gateway to a professional career. They serve the purpose of guaranteeing that the candidate has sufficient knowledge to carry the responsibilities of a doctor. They represent the method of selection. In medicine the Part I examination is the trap. It is rather unusual that a student fails Part II examinations when he has successfully passed Part I. It appears from the above mentioned statistics that, of the students matriculated at the medical faculty during the period 1947 through 1950, 57 per cent passed the Part I examination.

Within this century the medical curriculum has been changed 3 times. One can speak of a 1912, a 1936, and a 1954 curriculum. In Tables 2–8 the various topics and the distribution of courses and instructing periods are set out. It is evident how much specialization in medicine and surgery has contributed to the increase in numbers of topics taught. The adjustments of the medical education have been accomplished by adding new topics on top of the old and traditional ones. The tendency of specialization in medicine has evidently

TABLE 3

1912 CURRICULUM

SUBJECT	TERM AFTER DEGREE EXAM, PART I						
	1	2	3	4	5	6	7
General pathology	+	+	+	+	+		
Pathological anatomy	+	+	+	+	+		
Pharmacology	+	+	+	+	+		
Hygiene		+					
Medicine		+	+	+	+	+	+
Surgery		+	+	+	+	+	+
Obstetrics and gynecology						+	+
Ophthalmology				+			
Otolaryngology				+			
Psychiatry						+	
Pediatrics						+	
Epidemiology					+		
Dermato-venerology						+	
Forensic medicine							+

TABLE 4

1936 CURRICULUM

SUBJECT	TERM AFTER DEGREE EXAM, PART I							
	1	2	3	4	5	6	7	8
General pathology				(+)	+	+		
Pathological anatomy	+			+	+	+		
Pharmacology	+			+	+	+		
Hygiene					+	+		
Medicine	+	+	+	+	+	+	+	+
Surgery	+	+	+	+	+	+	+	+
Obstetrics							+	+
Ophthalmology				+				
Otolaryngology				+				
Psychiatry			+					
Pediatrics		+					+	+
Epidemiology				+				
Dermato-venerology		+	+					
Forensic medicine							+	+
Neurology			+					
Radiology			+					

TABLE 5

1954 CURRICULUM

SUBJECT	TERM AFTER DEGREE EXAM, PART I							
	1	2	3	4	5	6	7	8
General pathology		+	+	+	+	+	+	
Pathological anatomy	+	+	+	+	+	+	+	+
Pharmacology	+	+	+	+	+	+	+	
Hygiene	+					+	+	
Medicine	+	+	+	+	+	+	+	+
Surgery	+	+	+	+	+	+	+	+
Obstetrics and gynecology						+	+	
Ophthalmology				+				
Otolaryngology				+	+			
Psychiatry	+	+	+					
Pediatrics		+	+	+	+	+	+	+
Epidemiology			+	+				
Dermato-venerology			+	+				
Forensic medicine						+	+	
Neurology			+	+				
Radiology		+	+					
Orthopedic surgery			+					
Medical genetics					+			
Anesthesiology	+					+		
Physical therapy					+			

reached a peak by now. The work on a future curriculum will have to deal more with the reorganization of the teaching of the subjects, than with work on defining new topics to be included in the curriculum.

Other aspects must also be considered. The 1954 curriculum has been effective since 1956. In a recent number of the student's periodical, *The Medical Student*, a critical evaluation of the "new" curriculum was given by some of the students who have now finished their Part I examinations. They point to the difficult period of transition from school to university. It is suggested that group instruction be introduced within the first year. This should enable the new student to a quick and safe start. It is considered a waste of time to leave it to personal initiative to find out how and where to start. Older students rather than members of the teaching staff are suggested as leaders of this group instruction. The article gives good examples and details of some of the defects of the system. The number of teachers and instructors is claimed to be too small. The students prefer instruction in small groups instead of the traditional lecturing. They feel that teaching in smaller groups would make it possible to shorten the period of study. They also point to some humorous aspects of the teaching, i.e., the divergent teaching on the same subject by different people. It should be sufficient to quote one of the examples given. The diameter of the erythrocyte is 7.5 in physiology, 7.7 in biochemistry, and 7.2 in anatomy. For comparison is given the figure from the textbook of histology by *Maximow and Bloom*, 7.74, "remarkably uniform." It is evident that the use of examinations as a method of selection leaves the students with the idea that their fate is depending on the strength of a thread made up by details. The impression gained from the students' comments leaves little doubt as to the fact that the students are opposed to the traditional university training principle. They prefer the principle of school teaching.

It will be interesting to see what is going to happen, when the new school system becomes effective. It is to be anticipated that the future student will be even less prepared for the university type of teaching than the students are at present. "It is difficult to prophesy, particularly about the future," as one of our humorists once expressed himself. It may be that one should not be too pessimistic as to what is going to happen. On the other hand, voices have been heard predicting that it will be necessary for the university to leave its tradition of free admission and institute an examination before admission and matriculation can be effective.

Finally, one more point of interest should be mentioned. The long-lasting university periods of study are a financial burden on the students. A survey of the economical conditions of the students has been published in 1961 by the Ministry of Education (9). Four-fifths of the students at the university of Copenhagen were found to have regular paid work. Furthermore, statistical analysis of the available data showed that students who need to undertake paid work in order to carry through their studies are handicapped to a considerable degree. Quite a few students are married today. In the old days it was considered the obligation of parents or relatives to give the young the best possible education as a part of their contribution to his start in life. This tradition is partly disappearing. We are in a period of transition in social order and philosophy of the community. In addition, the young are to some extent more concerned about how to make a good living than about where to find the job that agrees with

TABLE 6
1912 CURRICULUM

EXAMINATION			TEST	COURSES		
Written	Oral	Clinical	Oral	Compulsory	Free	Compulsory clinical service
Part I A:				Hygiene		
General pathology		General pathology		Bacteriology		
		Pathological anatomy		Inoculation techniques		
Part II B:		Pharmacology	Dermatology and venerology			Clinical clerk 12 months
Medicine	Medicine	Medicine		Medicine clinical	Medical propædeutics	
Surgery	Surgery	Surgery		Surgery clinical		
	Forensic medicine			Dermatology and venerology	Surgical propædeutics	
	Obstetrics and gynecology			Ophthalmology		
				Otorhino-laryngology		
				Epidemiology		
				Psychiatry		
				Pediatrics		

their ability and personal qualifications. The advisors are no more the parents or the relatives, who know the youngsters. It is useless to argue against this. It is intruding everywhere. The younger generation is not to be blamed for the trends prevailing today. But these call for efforts to accomplish such working facilities within the medical school and the medical profession that the able person is attracted by the job.

The trends and moves in medical education are under constant observation by a committee established by the medical faculty. Statistics are prepared to evaluate the efficiency of the instruction given and the qualifications of the students. This must be considered of great importance if the standards of medical education are to be kept in line with the rapidly developing field of medicine and the needs of the patients as well as the needs of the students. The influential forces are manifold.

The postgraduate training.—The first Danish medical act dates back to 1619 (6). It drew up regulations for medici, chirurgi, and pharmacists. Only the approved medici were allowed to treat internal diseases. On the other hand, it was their obligation to treat sick people when asked for help. Definite rules for paying services were introduced by this royal decree. In another royal decree in 1672 it was stated that only people holding the degree of doctor medicinae at the University of Copenhagen were entitled to practice medicine within the borders of the kingdom. Prior to the promotion as a doctor of medicine the candidate had to pass an examination. In 1769 this was made public, and in 1788 this degree exam was made the prerequisite for obtaining a license to practice medicine. From then on the doctor's degree was merely a scientific university degree; and so it is today. Doctor medicinae in Denmark means doctor of medical sciences, whereas the American M.D. degree equals our candidatus medicinae. This title is given to a person who has fulfilled the requirements for the degree exam.

As in other European countries the surgeons were organized in the guild of the barbers. Regulations from 1668 for the training of a surgeon called for 3 years as an apprentice followed by 4 years' traveling in foreign countries. Before a surgeon could be admitted as a member of the guild he had to be examined by the medical faculty in the presence of some of the older masters of the guild. A surgical school independent of the university was established in 1736, and in 1785 this school was made the Royal Academy of Surgeons. The academy had the right to examine the surgeons, and a person holding this exam was entitled to practice surgery as well as medicine. This was changed by a royal decree in 1837 so that no one could practice medicine or surgery unless he had been submitted to the examination at the Academy as well as at the university. In 1841 the Academy and the medical faculty at the university were united, and since then the graduates from the university holds the degree as *candidatus medicinae et chirurgiae.*

Present-day regulations for the license to practice medicine and the obligations going with it are found in the Medical Act of 1934. According to this act the graduates from the university must go through 1 year of service in a public hospital (6 months in medicine and 6 months in surgery) in the capacity of intern. In addition, a 1-month course in obstetrics is required before one can become licensed to practice medicine on ones own responsibility. As a matter of fact, very few doctors settle as general practitioners at this point. As a result of an inquiry by K. H. Backer (published at a meeting in the Danish Medical

TABLE 7

1936 CURRICULUM

EXAMINATION			TESTS	COURSES	
Written	Oral	Clinical	Oral or written	Compulsory	Compulsory clinical service
Part II A:					
Hygiene	General pathology			Bacteriology (including inoculation technique)	
	Pathological anatomy				
	Pharmacology			Medical genetics	
Part II B:					
Medicine	Medicine	Medicine	Dermatology and venerology	Radiology	Propaedeutics
Surgery	Surgery	Surgery	Ophthalmology	Neurology	Clinical clerk 6 mo.
	Forensic medicine	Pediatrics	Otorhino-laryngology	Epidemiology	Advanced instruction
	Obstetrics and gynecology			Dermatology and venerology	Medicine 2 mo. out-patient department
				Psychiatry	1 mo.
				Ophthalmology	Surgery 2 mo. out-patient department
				Otorhino-laryngology	
				Operative surg.	1 mo.

Association in 1951) it was found that only 1 per cent settled without further training than that of internship. Most people will take some years of assistant residencies in various fields. The statistics showed that only 8 per cent had settled as general practitioners after 1 year of additional training; 32 per cent had 3–4 years before going into general practice. Not only from the point of view of training for the general practitioner are these early years of service within the hospitals of importance. They allow for the selection of suitable candidates for further training. The hospital staffs are recruited from this group under training.

By tradition the training follows the principle of the master-apprentice relationship.

No doubt this old system of training has advantages. The services of many physicians and surgeons have had the reputation of being outstanding training places. These men knew their apprentices. They made the selection of the ones they felt deserved a career within the field not only on the grounds of the professional skill. They knew their "boys." They were familiar with their personality, their family conditions, their ambitions, and many of the other factors contributing to a man's successful achievements. They could advise the young as to his chances of failure or success. They also assisted the young

TABLE 8

1954 CURRICULUM

Examination			Tests concluding courses	Compulsory courses	Free lectures or courses	Compulsory clinical service
Written	Oral	Clinical				
Hygiene	Pathological anatomy	Medicine examination including epidemiology and neurology	Dermatology and venerology	Surgery and surgical propaedeutics	Clinical laboratory techniques	Propædeutics Clinical clerk 6 mo.
Medicine	Medicine	Surgery: examination including orthopedic surgery and neurosurgery	Ophthalmology	Psychiatry (3 courses in three consecutive terms)	Anesthesiology	Advanced instruction
Surgery	Surgery		Otorhinolaryngology	Diagnostic radiology	Radiotherapy	Medicine 2 mo. outpatient 1 mo.
	General pathology		Psychiatry including medical psychology	Neurology	History of medicine	Surgery 2 mo. outpatient clinic 1 mo.
	Pharmacology			Epidemiology		Obstetrics 1 mo.
	Forensic medicine			Dermatology and venerology		Pediatrics 1 mo.
	Obstetrics and gynecology	Pediatrics		Orthopedic surgery		Epidemiology 14 days
				Physical therapy		Neurology and surgery 1 mo.
				Bacteriology including inoculation techniques		Psychiatry 1 mo.
				Blood transfusion techniques		

in obtaining the right positions in due time for promotion. This system has its risks, too. The selection made of candidates for future career may be influenced by irrelevant factors. If a young man is not a particular obedient or subordinate type of personality and gets into disagreement with a senior colleague, this may be disastrous in a small country. The young doctor may have a hard time advancing in his professional career.

Several factors are working against this old training system. The organization of hospital staffs, the rapidly widening content of medicine, and the splitting into specialties, the needs for earning a decent living early in the career and the changing social conditions are some of these influential factors. Today it is hard to grasp the content of more than a limited field, and to have a good training calls for more than to have acquired experience with the practice of one technique. Today circulation between a number of services is necessary if the training has to have quality. Even within the field of one specialty it is considered an advantage if the training period covers service on more than one hospital department. The splitting of hospitals into separate units adds to the organizational difficulties. If a trainee is not to reach the age of senility before he has finished his training, his time in one place must be of limited duration. This means that no one senior man will be responsible for the assistance and guidance giving the young trainee in the planning of his postgraduate training. When only knowing the man from shorter periods of association these older consultants are deprived of knowledge as to the personal dispositions of the young. For evaluation of potential qualifications limited information is available. We have entered into the situation where many of the activities of postgraduate training programs are left to the initiative and responsibility of the trainee himself. He is no longer an apprentice, he has become a student.

In consequence of the rapidly growing volumes of medical literature the young will claim that they have little if any means of finding out where to start and what to concentrate on in order to acquire a broad theoretical knowledge of a certain field. Textbooks differ as to opinion of even the essential fundamentals. The current literature has become so extensive that it calls for heavy work to trace the valuable contributions and the ideas inherent in them. The skillful and trained scientist has his troubles. Why should a man waste time on making himself an investigator when aiming at spending most of his working capacity in practical work? A strong call exists for planned postgraduate teaching.

The Medical Act of 1934 sets up the requirements for licensing medical doctors as specialists within the various fields. A special board exists for the evaluation of the qualifications of the candidates. This board advises the Ministry of the Interior, which issues the license. The members of the board are six in number and are elected so that they represent the interests of the medical faculty of the university, general practitioners, senior hospital staff members, and junior doctors.

The requirements for being recognized as a specialist are outlined. No one can obtain a license unless he has had 6 years of practical work after graduation from the university. The specific qualifications needed are set out for the various specialities. For most people it means from 8 to 12 years of training before the requirements are fulfilled. Qualifying are appointments to recognized hospital positions. The number of such qualifying positions is limited in some fields.

To some extent this has meant a bottleneck to some people aiming at obtaining a license as specialist within that field. This has led to the establishment of certain courses substituting certain parts of the practical training difficult to obtain by appointment in hospital positions. This arrangement has been introduced in psychiatry. Ordinarily 12 months' service in a department of neurology is required as supplementary training. The arrangement has been made that 6 of the 12 months of practical work may be substituted by 3 months' practical hospital appointment followed by a course in neurology.

In other fields, too, courses have been introduced. In anesthesiology and in surgery, to mention examples, courses have been arranged giving theoretical and practical instructions. In surgery it has been attempted to give short, lasting courses introducing the participants partly to the literature on certain more theoretical subjects such as metabolism, fluid therapy, antibiotics, etc., partly to present-day status in various fields. These courses have served the purpose of giving instructions supplementary to practical training. The surgical courses were arranged by the Danish Surgical Society.

In a recent meeting in The International Federation of Surgical Colleges it was pointed out, in a discussion on the training of surgeons, that the universities have failed so far in establishing a curriculum for postgraduate training. A practical need exists for an extension of the university education in order to assist people in their postgraduate training.

The essential question today is how to evaluate the qualifications obtained through courses. Strong forces are at work attempting to lead the system into that of examining boards guaranteeing that the requirements are fulfilled. This will mean more examinations. Most people feel that license to practice a special field of medicine must rest on practical experience. However true this may be, thorough training in any branch of medicine today calls for an extensive theoretical knowledge. The university has the organization that can offer thorough training without making it a necessity to set up new exams. It is only a question of economy. Attempts are being made establishing a program with stipends available to people who will do research work as a part of their postgraduate training. The medical research institutions are the natural framework for the molding of postgraduate training programs.

Medical research institutions.—The University of Copenhagen was established according to the model of other universities of Europe at that time. It has a heritage parallel to that of many other European universities. Characteristic elements of this heritage *Flexner* found to be the equal importance placed on teaching and research. To put it in other words, education of the next generation is the natural and logic consequence of successful achievements in research and practice. Publications represent a valuable advertisement for a school. Reputation is established in that way. A school of thought or practice is kept alive, however, by the instruction given the younger associates by the older members of a team.

The intimate relationship between scientific work and teaching is a vivid factor in the university traditions. With the chairs held by the faculty members responsible for the teaching of the theoretical fields of medicine go large research institutions with facilities for investigative work. They number as many as eighteen. They have been founded in the course of time and submitted to the influence of trends in other

countries. A great number of them carry established traditions. Some of the original buildings have been substituted by new ones offering improved working conditions for the staff, members of these traditional institutions. New institutions have been established in the shadow of recent developments in the field of medicine. Some of them have been raised by funds granted the university by foundations of industry and commerce.

On the clinical side, as well, strong traditions exist of the intimate relationship between investigative work and teaching. It is a characteristic feature of Danish hospital organization that no cleft separates the teaching from the practice of medicine. The country has two teaching hospitals in the true sense of other countries, but the teaching of students takes place to a certain extent in most of the larger hospitals in and outside Copenhagen. The greater part of postgraduate training takes place in the ordinary, general hospitals.

Needs exist for an increase in the capacity of the teaching institutions. It has been predicted statistically that the number of students will be doubled by the year 1970. It is evident that this calls for an increase in the teaching staff. Remembering the criticism of the students pointing to the number of instructors being too small today it is likely that the teaching staff must be considerably increased in order to meet the requirements. It is a problem how the recruiting of this highly qualified group can be accomplished in due time. The need for space is equally evident. Today the university authorities and the ministry of education are heavily engaged in the thorough planning of a gradual but quick expansion of the university institutions.

The Danish universities are institutions having the greater part of their subsidies from the State. The total budget of the University of Copenhagen amounts to about 30 Mill. Kr. Apart from wages and salaries the expenses covering the medical educational and investigative needs were in the fiscal year 1959/1960 1.5 Mill. Kr. Of this amount, 0.8 Mill. Kr. were covered by the annual allowance from the State, while the rest was made available by grants from various foundations.

There was a time when scientific work and research were considered a luxurious surplus of civilization depending on the financial conditions of the community. A shift is about to take place, and it seems to be accepted that investments made in research enterprises give a high degree of dividend when measured with the yardstick of achievements in the community and its living standards. In 1952 the Danish State Research Foundation was established. It makes grants available for research projects carried out in the various institutions as well as by individual investigators connected with hospitals or other practical institutions. On application the projects proposed are evaluated by a committee of experts (a committee exist for the various branches, such as medicine, natural sciences, humanities, the social sciences, and the agricultural and veterinarian sciences). The funds available for medical research amount to 0.5 Mill. Kr. It should also be mentioned that private institutions and foundations have made financial support available for research enterprises.

Research of today calls for large sums of money. The equipment has become numerous and increasingly expensive. The projects are growing as to extent and scope. Much of the work calls for the participation of groups of workers. In many fields the time has gone when one man could be working singlehanded for years in solving some problem, satisfying his curiosity and interests. The

race for results today has made this type of investigative work look like a waste of time. The group work calls for skilled technical assistance. The experienced and skilled technician can be made available only by intensive training and so is difficult to get when needed. The post-war period has meant to a country like Denmark intensive work aimed at regaining pace with other countries. At present thorough planning is made in order to follow up what has been accomplished in order to further develop the research capacity of the country. The world is in the midst of a heavy competition as to who is going to make the essential contributions, and voices may be heard declaring that no need exists for a small country to waste energy and fortune on participating in this competition. The prevailing idea is, however, that every community has its own problems calling for investigative work to test the various discoveries against the needs and problems of that community. There will always be a need for local enterprises, however costly they may be. Every endeavor carries the possibility of opening up new aspects of the problems investigated.

The Danish Society of Medicine recently started an inquiry aimed at furnishing the authorities with information as to how the research endeavors of the country can be intensified in the nearest future, how the research institutions can be expanded, how much of financial support is necessary, and how this can be distributed in the most beneficial and profitable way. A plethora of material has been received and is by now being evaluated and prepared for publication.

By tradition research activities have been bound to the university institutions offering the productive foundation for the teaching of students. Similarly, traditions have placed most of the clinical, investigative work within the large hospitals of Copenhagen. This century has led to an expansion calling for the participation of other hospitals with facilities for research. A reserve capacity exists and just awaits mobilization. Especially the rather small and closed communities around the provincial hospitals offer excellent facilities for clinical investigations and follow-up studies.

Within this century other research institutions than those of the universities have appeared. Statens Seruminstitut was founded as a laboratory for serologic and diagnostic purposes. Its functions are now three. It serves as a diagnostic laboratory for hospitals and general practitioners in bacteriology and serology. It is heavily engaged in the public health service and preventive medicine, and it is a research institution placing itself with high reputation in a number of fields such as bacteriology, virology, epidemiology, blood grouping serology, endocrinology, microbiology, etc. The material received for diagnostic purposes from hospitals and practicing doctors has been utilized in a very profitable way for research activities.

Finally, it should be mentioned that a growing pharmaceutical industry has resulted in the establishment of research laboratories working on the rational and industrious production of pharmaceutical products and medical equipment for the supply of the country and for export. It is not the place to mention all of them, but it seems fair to cite the Niels Steensen Institution. This has developed around the insulin production starting as early as 1922. It is now a foundation with large research laboratories and a hospital for the study of metabolic disorders incorporated in the institution.

These new endeavors in the scientific set-up of the country point to new trends of development. In the traditional re-

search institutions of the universities the number of staff members in permanent positions was rather limited. It was customary for young doctors to spend some years doing research and participating in the teaching of students in those institutions as a part of their postgraduate training. Today the number of people in permanent positions is increasing. A group of professional, full-time research workers has been established. This allows for continuity in planning the work of the laboratories, but it offers in addition excellent opportunities for instructing people spending only a shorter period of time participating in research work. The university institution has moved into a position allowing for taking up the training and teaching of the advanced students from the professional level. The universities will have to stop concentrating merely on the students' education, leaving to other institutions to care for the advanced education. Participation in postgraduate education on a reasonable scale will help to bring interest in scientific endeavors to the hospitals. It will give the research institutions a stimulating contact with practical life. This again will help the universities to a better understanding of the needs in the undergraduate training. It will be easier to reorganize the medical curriculum when the students' education can be viewed as only a part of the larger scale project of complete medical education.

The universities are facing the opportunity for new exploitation. The setting up of a postgraduate teaching program will mean new impetus to university life.

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The Changing Scene in Canadian Medical Education

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SUMMARIO

In le ultime 3 annos, education medical in Canada ha subite cambios notabile. Il ha habite un diminution desolante in matriculation de studentes medical, un problema que on ha nondum solvite in despecto de attaccar lo in varie manieras. Education graduate, al altere latere, floresce in le scientias basic, e durante que le subjectos clinic frue de popularitate in iste campo, on exprime certe dubitas re le systema "a duo nivellos" de Canada de recognoscer competentia. Education post-graduate es particularmente forte in ille regiones ubi on face effortios special de promover lo, ma iste effortios require appoio financiari special. Il ha habite reformas de curriculo, ma multes son usque nunc solmente regional. On pote remarcar un empleo crescente de patientes private pro inseniamento, e un schola instituevа un programma combinate de scientia e medicina con le Facultate de Artes e Scientias. In le campo de recerca, le disveloppamento le plus importante ha essite le establimento del Consilio de Recerca Medical. Le cambios le plus colpante, nonobstante, ha essite in le milieu social in le qual le education medical opera. Un plano de hospitalisation appoiate per le governamento es ahora in omne partes del pais, e su effecto super education medical se senti yam. Solutiones al problemas resultante ab iste disveloppamento debe appoiar se super negotiation inter le scholas medical e lor autoritates provincial de sanitate. Complete programmas de attention medical appoiate per impostos son imminente, e on observa attentivemente lor impacto possibile super le maestramento medical.

Medical education in Canada as it appeared in 1958–59 was described in the Special International Issue of the journal just 2 years ago (9). Since then, changes worthy of mention include a distressing decline in medical student enrollment, several developments in curriculum, increasing interest in continuing education for the health professions, and the inauguration of the Medical Research Council of Canada. The most striking changes, however, have been in the social milieu in which medical education does its work. The advent of tax-supported hospitalization plans across the country and the imminence of similar developments in other health services must inevitably have important implications for the medical schools and their affiliated hospitals. How certain problems are being met, as well as the new plans of the Association of Canadian Medical Colleges, will be described. In large measure this paper reflects the views of the twelve Canadian medical schools as expressed at meetings of the Association and in recent comments by their deans. At the same time, final responsibility for this interpretation must rest with the authors.

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STUDENTS

Undergraduate.—There have been no great changes in the premedical programs. Certain schools either insist upon a bachelor's degree or strongly recommend it, whereas most are prepared to accept students who will enter the faculties at a time when they have at least 1 more year to complete before they could receive a degree.

Although there has been no major change in the requirements for admission and although the numbers of university students in general have in-

creased markedly in the past 2 years there has actually been a drop in the number accepted by the medical schools. The reduction appears to be due to a lack of applicants with suitable qualifications. According to the most recent figures available, Canadian schools actually accepted 78 fewer first-year students than they could have enrolled if there had been a sufficient number of suitable applicants (11).

It should be stressed that there are still many rejected applicants each year, but these are almost invariably individuals who, in the eyes of the admissions committees, do not have a reasonable chance of success in medical school. That the committees are bending over backwards to accept all reasonably competent applicants is made amply clear by the fact that the withdrawal rate in first year in 1960 was 9.1 per cent (compared with 7.8 per cent for the U.S.A. [13]).

Basically there has been little change in the selection process. Although four schools now require applicants to have taken the Medical College Admission Test, it is still too early to assess its full value for Canadian student selection. Little use has been made of interest inventory or other tests designed to indicate personal suitability for medical sciences. Most schools rely chiefly upon academic average in premedical years. The use of personal interviews is general, although most chairmen of selection committees doubt their value for predicting academic performance. They are useful, perhaps, to spot gross inadequacies in applicants, and provide personal contact with acceptable candidates which may be renewed at the time of registration.

Over the years, from 10 to 15 per cent of students in Canadian medical schools are from other countries, with over half of these coming from the United States. This means that the shortage of suitable Canadian applicants is even more severe than appears on the surface, since Canadians leave about 170 places vacant in first year, and students from outside fill 90–100 of them. Moreover, about 35 per cent of the doctors registering in Canada in the past 5 years have been graduates of schools abroad. It is clear, therefore, that Canadian students alone do not come near to filling the needs of this rapidly growing country. Since the supply of physicians from overseas cannot be counted on indefinitely, Canada, too, faces the probability of a serious shortage in medical manpower.

Most of the schools are gravely concerned with the problem of how to attract a sufficient number of well prepared students. More active recruiting measures are being adopted to dispel the misconception still lingering here and there that one must be exceptionally clever to gain entrance to medical school. The most serious deterrents, however, seem to be the length and the relatively greater cost of the medical course. To a youth of 18 it looks like "a long and difficult road beset by financial hazards all the way."

There is divided opinion on the question of whether more loan funds or more bursaries are needed. The conviction that fear of a large debt militates against the wisest selection of career or internship seems to be growing. It is of interest to learn that applicants from Newfoundland have been more numerous since its government inaugurated generous bursaries: $1,200 annually for 5 years, in return for which the graduate must practice for 4 years in the Province. It is pleasing to note a substantial upswing in applicants to Dalhousie University, Halifax, from the four Atlantic provinces. Whether this is a result in part of the most intensive program

of continuing education in Canada is hard to say.

There has been no shortage of applicants at Laval and the University of Montreal (the two French-speaking schools, both in the Province of Quebec). It is gratifying to learn, therefore, that Canada's thirteenth medical school is to be established at the University of Sherbrooke, about 100 miles south-east of Montreal. On March 1, 1961, Dr. Gerard L. Larouche became the first dean.

Graduate.—As elsewhere, graduate education in medicine is of two types—study toward a higher university degree and training in a medical specialty to meet the requirements of the Royal College of Physicians and Surgeons of Canada, or of a provincial licensing board as in the case of the Province of Quebec. Both programs have undergone expansion. Table 1 shows that in 3 years the number of students enrolled for Masters' degree programs has increased by somewhat over 50 per cent, whereas in the same period the number enrolled for work leading to a Ph.D. degree has increased by somewhat less than 50 per cent. At least some of these students have already received M.D. degrees, but a large number of them are proceeding to their advanced degrees directly. It is not known how many, because of financial or other difficulty, are taking a graduate program in basic sciences rather than the more expensive M.D. course. Apprehension has been expressed on two scores: some of these medical scientists would make excellent clinicians, and some might be more useful medical science teachers if they possessed both M.D. and graduate degree experience.

The major fields which attract graduate students are, in descending order of numbers enrolled: biochemistry, physiology, microbiology, pharmacology, and anatomy. Biochemistry is the most popular field in both Master's and Ph.D. programs, and also had the largest number of M.Sc's and Ph.D.'s granted in 1960. In spite of this predilection of graduate students for biochemistry, there is a serious shortage of clinical biochemists in Canada. This matter has been referred by the Association of Canadian Medical Colleges at its 1960 meeting to the Royal College of Physicians and Surgeons of Canada for further study. Only a few universities grant higher degrees for graduate work in the clinical departments of their medical schools. Others are contemplating such programs.

TABLE 1

GRADUATE STUDENTS IN CANADIAN MEDICAL SCHOOLS

Type of student	1957-58	1959-60
Masters:		
Enrolled	120	196
Granted	53	68
Ph.D.:		
Enrolled	118	165
Granted	42	37

Training for the medical specialities has been the responsibility, for the most part, of hospitals approved for this purpose by the Royal College of Physicians and Surgeons of Canada. A few universities offer graduate programs in certain specialty fields, and some award diplomas at the successful completion of such courses. In most cases, however, members of the medical faculty are involved in specialty training by virtue of their hospital positions. In recent years the Royal College has encouraged a closer link between the universities and the hospital programs. This has been done by granting approval of training on the condition that the hospital program be affiliated with the medical school in the region. The purpose of urging closer relationship with the universities

was to reduce two problems; the tendency on the part of some hospitals to enroll candidates for specialty training who were quite unlikely to pass subsequent examinations for certification as specialists; and the practice of some trainees of moving annually from one hospital restricted to 1 year of training to another with a similar limitation. Under the latter circumstance the candidate was unlikely to carry increasing responsibility as he passed from one hospital residency to another. There is no doubt that hospital training programs would benefit from the usually greater experience of the universities in scrutinizing applicants and in documenting their performance.

For nearly 2 decades Canada has had two standards of training and examination for specialty listing. The Fellowship of the Royal College of Physicians and Surgeons of Canada in either Medicine or Surgery, or as modified for the various sub-specialties, is the hallmark of scholarly qualification for staff membership in most of the major teaching hospitals. The other route to specialty rating is by way of the Certification Examinations, also regulated by the Royal College with the advice of its various specialty committees. This listing, which stands for professional competence in the specialty, is based on a somewhat less exacting examination than in the case of Fellowship.

This two-level arrangement has accelerated the production of specialists to meet urgent public need. Its disadvantages, however, have stimulated the Royal College to call on the Canadian Medical Association and the various specialty societies to examine afresh the whole problem of certification of specialists. Ideally, a single, high standard of training for specialty practice would be desirable. In certain specialties, e.g., neurosurgery and cardio-thoracic surgery, the consensus appears to be that certification should be only by way of the fellowship standard of training and examination. On the other hand, there is recognition of a probable need for some years to come for the certification examination in some specialties, e.g., anesthesia, psychiatry, public health, diagnostic radiology, and rehabilitation. Many Canadian communities are inadequately covered in these specialty fields.

There is still another argument against too hasty decisions on some of these issues. With increasing frequency one hears expressions of doubt as to the permanence, or even the educational validity, of certain features in current training programs. In nursing education it has been recognized for some time that, in order to be a good nurse, the student need not make a bed hundreds of times. In hospital residencies there may be the same need of an educational evaluation of the amount and type of services rendered by the young person whom we would fain call a graduate student. A clarification of objectives is required, and then the extent to which actual accomplishment falls short of these goals should be determined. The corrections required could then be indicated, and only then could accreditation of training programs be carried out with full confidence.

Postgraduate.—Canadian experience in Continuing Medical Education would seem to confirm the view that interest and results depend upon the imagination as well as the zeal of those responsible for the program. After enjoying popularity for years, the standard type of refresher course for general practitioners may lose its power to attract; under these circumstances eminent guest speakers have found themselves talking to empty chairs! Discussions at District Medical Society meetings may be popular, but often are not. Since short

courses at university centers are said to be attended by the same enthusiastic "repeaters," there must be many doctors who are not touched by any postgraduate program. It is certain that some of these will be brought into the fold through the efforts of the College of General Practice of Canada, which gives credit for attendance at courses and meetings. In the long run, the most rewarding approach seems to be that of assigning the postgraduate program to a relatively senior teacher as his major university responsibility. Close collaboration with professional societies aids in administration of a program and in assessment of the topical interests of prospective participants. Finally, the most successful programs in Canada seem to have benefited from special financial backing.

Although many other Canadian medical faculties have had well established refresher courses for many years, the most systematic coverage of a major region has been that of Dalhousie University in the Maritime Provinces (7). Directed by an Associate Professor of Medicine, the Postgraduate Division of the Faculty of Medicine has conducted, over a decade, a variegated program in Halifax and in the secondary and tertiary centers of a 94,000 square-mile area. The intramural program has attracted from 15 to 20 per cent of the practitioners. Registrations last year reached a total of 3,000 in all activities.

A further step of great interest has been undertaken at the University of British Columbia (14). With the aid of the W. K. Kellogg Foundation, a Department of Continuing Medical Education has been established, with a full-time professorial head and close relations with the professional associations, the teaching hospitals, the alumni, and the university's extension services. It will concern itself with other health professions, and it will base its program on a survey of activities in the 10-year period, 1950–1959. Here and at other universities there is increasing interest in ascertaining more precisely the nature of the educational needs of members of the health professions. Along what lines do the doctors and nurses of communities of various kinds require assistance? What is their own view of the problem? Under the circumstances, what steps are feasible to help the health worker continue to learn on his own? This approach benefits from consultation with the experts in adult education and in research on community development.

CURRICULUM

Changes in the curricula of Canadian medical schools in recent years have been in the direction of patterns prevalent in the United States. The clerkship in the fourth year has been strengthened and in some universities extended into the third year. Duplication of instruction has been reduced by inter-departmental coordination and varying degrees of integration; psychiatry has achieved the status of a major discipline; preventive medicine has been broadened to include a major emphasis on the social aspects of health and disease; and, finally, in one university there is the option of a combined course in Science and Medicine with an abundance of electives and the opportunity to pursue a special interest in some depth.

Formerly, some of the final year clerkships gave the students relatively little clinical responsibility. This, in general, has been corrected despite the need in some schools to rely increasingly on private medical practice for teaching cases (3). Three schools—Dalhousie in Halifax, Laval in Quebec, and the University of Montreal—retain the undergraduate internship (fifth year). They are con-

vinced of the value of maintaining educational control over this stage in medical training which so often becomes subservient to hospital service requirements. With the cooperation of the provincial licensing bodies two other schools have managed to restrict their graduates to internships in teaching hospitals. The trend, therefore, is to regard the internship as an extension of the clerkship; more than before, it seems to be within the orbit of university interest.

One of the most notable post-war developments has been in psychiatry. Most of the twelve schools now have full-fledged departments, with geographic full-time staff. Teaching generally begins with Personality Development and Interviewing in the early medical years. In-patient and out-patient experience follows in the clinical period. The pattern of psychiatric teaching in Canada is more like the American than the European. It has been said that, whereas the Canadian approach is more psychodynamically oriented than that of most European schools, no Canadian department is as psycho-analytically oriented as are departments in most American schools. Canadian teaching tends to be eclectic, presenting genetic and neurological aspects along with psychological theory. There is satisfaction, on the whole, with the improved ability of the graduates of recent years to cope with the emotional problems encountered in medical practice.

A similar but later growth of the role in the curriculum, and of staff in the faculty, has been seen in Preventive Medicine or Public Health. A major change in emphasis was on its way a decade ago when the university professors in this field induced the Medical Council of Canada to base its examinations on such knowledge and skills as they would expect a good practitioner to possess. A more recent change has been a swelling of interest in the social aspects of health; not only the influence of social factors on the incidence of disease and the impact of disease on society, but also the means whereby society organizes its resources for health in the community. The more general use of the term Social Medicine reflects this change in emphasis (5). An inevitable accompaniment of this movement has been a new awareness of the significance to medicine of the social sciences and of the help to be derived by closer association with social scientists (6). Six medical schools provide instruction in sociology for their medical or graduate students. Although only one of these has a full-time sociologist on the medical faculty, the first appointment of this type in Canada was made in 1949 at the University of Western Ontario (1). In at least eight schools there have been fresh attempts to stimulate student interest in community health matters by way of orientation lectures in first year, seminars, project studies, home medical care, or specific assignments in rural preceptorships.

McGill University in Montreal has introduced a new program which is being watched with interest by medical educators across Canada. As yet no assessment of its final value can be made, but, because it is unique in Canada, it will be outlined here.

Students at McGill may now proceed to an M.D. degree by one of two routes. The regular one is the conventional plan of 3 or 4 years in Arts and Science, with wide latitude in the selection of classes, followed by 4 years in the Medical Faculty. The latter program has recently been revised extensively to allow the student increased amounts of free time plus the opportunity to do elective work in his 3d year in either the basic sciences or the clinical disci-

plines. Major clinical disciplines are taught largely in unbroken blocks rather than mixed together during the week.

The second route by which an M.D. may be obtained at McGill is not possible at present in any other Canadian university. A small number of mature students with outstanding high school records will be accepted directly from junior matriculation into a 7-year program leading to the degree of Doctor of Medicine. At the end of the fifth year the B.Sc. degree is awarded. An alternative arrangement permitting the B.A. degree is contemplated.

In essence this is a combined Arts and Science and Medicine degree program, with overlapping studies in both faculties. The student must take sixteen Arts and Science classes, one of which must be English, and four must be required science courses. The rest must be approved by the Deans of both Arts and Medicine. The student also takes all the medical classes taken by those in the regular 4-year medical program.

The Arts and Science classes continue until the fifth year of the 7-year course, and, at the end of this year, the student is awarded a B.Sc. degree. The medical classes commence 3 years before the student completes all the classes in Arts and Science and continue to the end of the 7-year program.

The program thus permits a blending of professional and nonprofessional studies and allows the individual to proceed smoothly to the end of his course. Since no major break occurs between premedical and medical subjects, the continuity should be of considerable advantage to the student. This program also means that the able student can be assured that, as long as his performance is satisfactory, he can proceed directly to a medical degree without having the unsettling experience of waiting to see if his application to enter a medical faculty is accepted. A disadvantage would, of course, be that a student commits himself very early in life to a career in medicine. While many are sure at that age that medicine will be their goal, these ideas may change after a few years of university, and the student may feel forced to continue in a profession that is no longer the one of choice.

It is hoped that, once the program has been running long enough to assess its results, a careful study will be made to determine whether other universities should follow this example set by McGill and a number of American universities. One requisite is the availability of a sufficient number of good applicants. Another is the availability of a wide variety of suitable classes in Arts and Science from which subjects may be selected that fit in with the medical timetable. Other considerations, as well as the educational goals of this approach, have been described by McGill University's dean of medicine (8).

STAFF

In the twelve Canadian medical faculties there are some 550 full-time positions at the level of Assistant Professor or above. (Duties and nomenclature below this rank vary so widely that a useful comparison is impossible to obtain.) Of these 550 places about 10 per cent are vacant in both the basic sciences and clinical fields. There are almost three full-time positions in basic sciences for every two in the clinical disciplines. Both groups depend a great deal on part-time teachers, but this is especially true of the clinical subjects, where 1 year ago 85–90 per cent of the members of staff were on part-time appointments.

The growth of full-time staff in clinical departments has been a striking feature of Canadian post-war medical

education in nearly all its centers. In the smaller schools it is common for there to be an increase from one or two, or even none, to fifteen or twenty of these individuals in the 15-year period. The most frequent appointment is the "geographic full-time" arrangement whereby the clinical teacher's income is derived from both institutional salary and a limited consulting practice conducted from an office in the teaching center. In more than one medical school the surplus earnings from practice are pooled to help support teaching, research, and travel activities. In one school the teachers in psychiatry and rehabilitation medicine are on a strictly full-time basis, their services being rendered to patients at the expense of the provincial government. In several places both pathologists and radiologists receive their incomes from institutional salaries only.

In 1959 Wiggins *et al.* (12) reported that 34 per cent of the staff members of basic science departments in the United States possessed an M.D. degree, compared with 60 per cent for the same departments in Canada (10). Of those Canadians with an M.D. degree, 12 per cent possessed a Ph.D. also, and almost all those without the M.D. had a Ph.D. Only 3 per cent of the staff at the level of Assistant Professor or higher were without a doctoral degree of any kind.

The great majority of teachers without an M.D. degree are found in the sciences of physiology and biochemistry. In the latter discipline the Ph.D.'s outnumber the M.D.'s by 4:1, while in the departments of physiology they are in a slight majority.

Up to the present, although there are certain vacancies in the various faculties of medicine, the existing staffs can apparently handle their teaching duties and still find some time for research. Few departments, however, are doing as much research as they think they should do. It is probably also true that most schools are prevented from moving as far as they might like toward more individual methods of teaching because of limitations in staff. If the numbers of students are to be increased appreciably in the near future, new staff will have to be obtained unless present instruction in small groups and the use of project methods are to be jeopardized. Just where the new teachers will come from no one is prepared to say. As everywhere else, the situation is most serious in the basic science fields. As might be expected, the most serious limiting factor in some schools is budget.

RESEARCH

The establishment, in 1960, of the Medical Research Council of Canada was an event of major importance to medical research. Its significance is apparent only when one realizes how recently such research has developed in this country. Apart from McGill and Toronto, little was being done until the National Research Council in 1938 set up its Associate Committee on Medical Research with a budget of $53,000 for grants-in-aid to serve the nine schools then existing in Canada. By 1946 its budget was only $200,000. Today, the newly founded Medical Research Council is starting off with $4,600,000 for its first year. An even larger amount is available for medical research through the federal departments of National Health and Welfare, Defense and Veterans' Affairs.

The rapid growth of funds available for research is illustrated still more concretely by citing figures from one of Canada's small but senior medical schools. In 1946 it was in receipt of one research grant of about $3,500. By 1954, grants from all sources totaled around $80,000. For 1961–62 they

amount to over $300,000, and more could be used to advantage were it available! In this school there has been a doubling of the full-time staff in the basic science departments; in clinical fields the increase has been from two to fourteen. At the same time, as in other schools, the waxing of scientific ferment has sharpened the interest of teachers and students and has contributed greatly to morale.

The founding of the new Medical Research Council grew out of action taken by the Association of Canadian Medical Colleges in 1957. Alarmed by the prospect of "holding the line" in the budget of the N.R.C., a delegation of members of the Association and several senior scientists met with representatives of the Canadian Government to discuss the future support of medical research. The result was the formation of a national committee and the production in 1959 of what is called the Farquharson Committee Report. It stressed the importance of research in good medical education and the need, therefore, to strengthen medical research facilities in the universities. The establishment of a Medical Research Council, replacing the Associate Committee on Medical Research of the N.R.C., was recommended to "advise on policy and matters relating to medical research," while its budget, augmented annually, was to support expanding programs by means of project and term grants, fellowships, associateships, and general grants to medical schools. Simplified administrative procedures and more elastic terms were urged. Finally, a plea was made for construction grants to provide increased facilities for research in medical schools and teaching hospitals.

Not only did the Government establish the Medical Research Council of Canada, but it appointed as its first president Dr. Ray F. Farquharson, formerly Professor and Head of Medicine at the University of Toronto. Familiar with medical education and research throughout Canada and respected widely as a statesman of the first order, Dr. Farquharson has led the new Council through its first tour of duty with considerable success. As one might expect, although the budget was increased considerably, there has been equal expansion of the research requirements of Canadian medical schools. In each one there has been disappointment when some faculty member's application was rejected or when the sum applied for was reduced. Nevertheless, the advent of the Medical Research Council of Canada is acclaimed as one of the most important developments in many years.

One recommendation of the Farquharson Committee report has met with a disappointing response. It was urged in the report that funds be made available for the construction of research facilities for both university departments and the investigation units of teaching hospitals. An amount of $37.000,000 was a conservative estimate for needs on these two scores. It now appears unlikely that the M.R.C. will be permitted to administer construction grants (2).

THE IMPACT OF TAX SUPPORTED MEDICAL CARE PROGRAMS

Ever since the Province of Saskatchewan introduced a hospitalization plan in 1947 there has been a steady advance toward universal hospital insurance and, more recently, universal medical care. At present the provinces co-operate with the Government of Canada in providing their residents with universal hospital care. Certain governments have taken positive steps toward establishing prepaid medical care plans or are considering doing so. Both types of plan have important implications for teaching.

In April, 1957, the Government of Canada gave approval to a bill authorizing the federal government to assist the provinces in providing hospital insurance and laboratory and other diagnostic services. In the same year the Association of Canadian Medical Colleges presented to the Minister of National Health and Welfare a brief on the subject of national hospital insurance and its relation to medical education. It stressed the importance of medical education for the success of such a program and the need of interfering as little as possible with either the supply of patients (both in-patient and ambulatory) or the arrangements necessary for undergraduate teaching and resident training.

The brief recommended the availability of at least ten teaching beds per final-year student. The necessary conditions of a teaching service were outlined—a sufficiency of teacher-physicians, the team approach, graded responsibility under supervision, and the highest priority for the welfare of the patient. No change should be permitted in the working arrangements of a teaching hospital that would prevent the physician-in-charge from allocating appropriate duties to the members of his team. It was noted, too, that costs in teaching hospitals must inevitably be higher than in others. Both operating and capital budgets should allow for this.

These views were re-affirmed in another discussion with representatives of the federal government in 1960. They were received with sympathetic understanding. It was clear, however, that little more could be done at the federal level. In the last analysis the maintenance of satisfactory standards of medical education rests upon negotiation between the medical school and its provincial hospital authority. In general, the provinces with the longest experience in the field of universal hospital coverage have recognized the special needs of major teaching hospitals. Many other aspects of these problems, particularly those dealing with relationships between university and hospital, have been discussed recently by the Dean of Medicine of the University of Toronto (4).

Of even greater interest will be the effect on medical education of various medical care plans now under discussion. In 1944 the federal government tabled in the House of Commons a bill to introduce National Health Insurance, but further action was not taken. In June, 1960, the government of the Province of Saskatchewan was returned at election on the issue of a compulsory, contributary, comprehensive medical care plan. Additional features included an emphasis on quality of care, preventive services, the safeguarding of teaching and research facilities, and the acceptability of the plan to those providing as well as those receiving the services. A broadly representative Advisory Planning Committee has been set up to explore methods of implementing a medical care plan along these lines. Its studies touch on all health needs and the adequacy of existing services to meet them. A report is to be returned in time to permit the Government to implement such a plan in 1962. Members of the Committee have examined medical care arrangements in Britain, Scandinavia, and other European countries as well as in Australia and New Zealand. Briefs have been received from many public and private bodies, and their viewpoints discussed at public and private hearings.

The brief from the College of Medicine of the University of Saskatchewan dealt with the relations of medical care planning to medical education and research. Attention was directed to the need of increased training facilities for

all the health professions. The view was advanced that any organized health service owed its patrons a continuing analysis of its performance by the methods of operations research. Such a service should support continuing education in the health professions and should concern itself with recruitment and training in those occupational fields in which a shortage of personnel endangers the quality of health care. Believing that the desirable magnitude of all such activities would vary directly with the size of the total medical care enterprise, no matter how organized or under what auspices, the faculty recommended: "That the Province devote to the provincial programs of education and research on which standards of quality of medical care ultimately depend, an annual sum of the order of three per cent of the total cost of medical care in Saskatchewan."

As this is written Canadian eyes are following medical care developments in Saskatchewan closely, and meanwhile on the national scene certain events are foreshadowing further developments which will have a bearing on medical education across the country. The Liberal party, official opposition in parliament at present, has gone on record as favoring the introduction of some form of tax-supported medical care program. The federal government, reflecting as it does the views of the Conservative party, has set up a Royal Commission to investigate the health needs of the country, but detailed terms of reference have not yet been promulgated. Medical schools are studying all these developments carefully. Teaching and research have a vital role to play in determining the quality of the health services rendered. With so much at stake it is imperative that their support must not be interrupted.

THE ASSOCIATION OF CANADIAN MEDICAL COLLEGES

Formed in 1943 to consider problems related to medical education during the Second World War, the Association was composed of representatives of the ten medical faculties in existence at that time. With the deans sat representatives of the Canadian Medical Association, the Department of National Health and Welfare and other bodies, depending upon the nature of the agenda. Latterly, they have enjoyed the presence of an officer of the Council on Medical Education and Hospitals of the American Medical Association, or of the Association of American Medical Colleges or both. Collaboration with these organizations has included the collection of data from the Canadian medical schools for incorporation in the annual report of the A.M.A. Council. The statistics from the last two surveys of the Canadian schools, and commentary on them, have been reported by the Secretary of the A.C.M.C. (10, 11). The Canadian faculties have found the information reported from the surveys to be exceedingly helpful.

As potential affiliate or as affiliate members of the Association of American Medical Colleges, the Canadian medical schools have had the benefit of visitations by the Liaison Survey Committee of the A.M.A.-A.A.M.C. Again and again their reports have assisted the Canadian universities in getting improved budgets and facilities for their medical colleges. The presence of a Canadian dean on each survey has probably assisted the Committee in interpreting local conditions. Certainly, it has helped the Canadian group to keep in touch with trends in American medical education. A further contribution to this end has been the inclusion each year of the President of the Canadian organization on a survey team visiting an

American school. At present, all twelve Canadian schools have qualified for affiliate membership in the Association of American Medical Colleges. The benefits from participation in the annual meetings and teaching institutes, from the surveys, and from the readiness of the Chicago staff to assist generously whenever aid is sought, are greatly appreciated.

The plan of the Canadian schools to extend their own organization, as described below, by no means implies any thought of severing this valuable and congenial relationship. The hope would be that the nurturing in Canadian medical schools of certain elements of their British and French medical and cultural heritage, which they prize greatly, would enrich the development of medicine in the Americas. The varied population of our country will best be served, it is believed, by recognizing not only those principles which have universal and enduring validity but also those variations in expression or application which are demanded by regional differences in custom, resources, and history.

An important recent decision has been to establish a permanent Canadian secretariat on medical education. This move stems from a growing sense of urgency to foresee Canada's future requirements in numbers and types of physicians. Should present medical schools be extended and if so, by how much? Should new schools be established, and if so, where should they be located? The falling off in applicants for medicine with unfilled classes from time to time in several schools has suggested the need of scrutiny of all the factors that determine career selection by bright high school graduates. It is conceded that both the length and the cost of the medical course are serious deterrents to the study of medicine. The magnitude of these factors is still unknown, as is also their relative importance compared with other influences that may lure a disproportionate number of young people into various "pure" sciences or into engineering or other industrial occupations. Without such information it would be hard to advise on how best to reduce the financial burden and how to recruit most effectively.

With a view to answering such questions, the Association of Canadian Medical Colleges, the Canadian Medical Association and the Royal College of Physicians and Surgeons of Canada have agreed to establish a Secretariat on Medical Education. The A.C.M.C. is seeking legal incorporation to aid in its quest for financial support from both governmental and private sources. In addition to the above objectives, it is likely that the Secretariat would serve medical education in many other ways.

SUMMARY

In 1961 Canadian medical education faces several problems and has found solution to several others. A government-supported hospitalization plan is now country-wide, and its effect on medical education is already being felt. Solution to problems stemming from this development must rest upon negotiation between medical schools and their provincial health authorities. Complete, tax-supported medical care programs are coming closer to reality, and their possible effects are being carefully watched.

The problem of falling enrollment is being attacked in various ways, but the degree of success in such attacks is still, apparently, disappointing. Graduate education flourishes in the basic sciences and, while the clinical subjects also enjoy popularity in this field, certain doubts are being expressed about Canada's "two level" system of recognizing competence. Postgraduate education is particularly strong in those re-

gions where special efforts are made to promote it, but these efforts demand special financial support.

The curriculum has undergone certain developments, many of them as yet regional. There is an increasing use of private patients in our teaching, and one school has instituted a combined Science and Medicine program with the Faculty of Arts and Science.

In the field of research the most important development has been the establishment of the Medical Research Council to replace the Associate Committee on Medical Research of the National Research Council.

It is clear that Canadian medical education is in a healthy state. It continues to adapt itself to changing situations, it conducts certain experiments, the results of which are eagerly watched and willingly emulated when experience shows the result to be favorable; while over-all it displays a fine hybrid vigor, the result of a combination of traits from its European and its American heritage.

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Advances in Medical Education in Germany

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SUMMARIO

Le regulamentos que governa actualmente le maestramento de studentes medical como anque le experientia post-graduate e le licentiamento de medicos, pro le toto del Republica federal, esseva ponite in circulation in 1953, e de nove, aliquanto revidite, in 1958. Illos son le resultato—in effecto un compromisso—de forte controversia inter le advocatos de assimilation de methodos american de inseniamento, e le fortias conservative que desira preservar le formas traditional de instruction academic. Le regulamento mantene le admission traditionalmente non-restringite de studentes a scholas medical, in despecto de critica acerbe. Il non ha habite cambios etiam in le longor del curso medical: un minimo de 11 semestres—5 preclinic, 6 clinic—es ancora obligatori. Nonobstante, facultates medical ha libertate complete in le designo detaliate de lor programmas de inseniamento (un plano de introducer un horario fixate secundo le systema american, debeva esser abandonate a cause de conflicto con principios academic fundamental. Un innovation importante ha essite le introduction, al fin del secunde semestre, de un examine in scientia basic, le *Vorphysikum*, in addition al *Physikum* traditional 3 semestres plus tarde. On ha facite nulle cambios fundamental in le methodos de inseniamento clinic; le "grande conferentia," con demonstrationes de casos, es etiam lor puncta focal, ma in alicun scholas german inseniamento de parve gruppos deveni crescentemente popular. Le examines final, post le completion del curso (il non ha examines al fin del anno) son ancora effectuate per committees, nominate non per le facultates medical ma per le Stato. Un examine final continua per 3-4 menses ma on ha reducte nunc le numero de subjectos ab 19 a 12. Le grado de D. M. es conferite post examine additional—fixate per le Facultate—e post submitter un dissertation scientific. Pro compensar un diminution in apprentissage hospitalari pregraduate (ab 6 a 3 menses), on require nunc del medico juvene un periodo de 2 annos (previemente un anno) de esser aide ante que on accorda licentia a practicar. Iste se considere uno del cambios le plus dramatic introducite per le nove regulationes. Alicun reformas vermente liberal son in processo de esser considerate per le Consilio Scientific German (le autoritate supreme pro promotion de scientia) ma al presente illos non ha progressate foras del stadio cyanogramma.

Efforts to create a uniform system to govern medical education in all parts of Germany date well back into the 19th century. Already in 1869 it was ruled by the Reichsgewerbeordnung (Trade Authorities) that state approbation was required by doctors wishing to practice medicine in Germany. The approbation was granted on production of proof of skill and ability. However, it was only 14 years later, in 1883, that regulations were formulated to control medical studies officially in the Germany of that era. Since then the training of the medical student has been subject to many changes and improvements, some of them fundamental, and all designed to bring the curriculum up to date with current advances in medical science. The regulations at present in force to govern the training and examinations of medical students, and the postgraduate practical experience and approbation of doctors, for the whole of the Federal Republic, were issued on September 15, 1953. In their improved form of March 28, 1958, these regulations are at present law, binding to all the countries of the Federation.

There has been a good deal of controversy, some of it heated and prolonged, over the new regulations and the

training programme of the medical student. Those advocating an assimilation of American teaching methods into the training of German medical students were opposed by strong conservative forces wishing to preserve the traditional form of academic instruction as it had developed from its historical roots. The outcome of these controversies has been a compromise, which, like any compromise, is far from ideal, but which all the same represents a considerable improvement on past practices in the organization of medical training. In contrast to other countries, such as Great Britain, Russia, and the U.S.A., there are no independent medical schools in Germany. Each medical faculty is an integral part of a university, a state of affairs which has developed logically from the historical background of the universities and the traditions of medical teaching. The only exception is the relatively young Medical Academy at Duesseldorf (founded in 1907), where the medical student, however, only takes the clinical part of his course—i.e., the last 6 semesters (3 years). At the beginning of his training, he will have to matriculate at one of the eighteen universities in the Federal Republic. These are the Universities of Berlin (free university), Bonn, Erlangen, Frankfurt, Freiburg, Giessen, Goettingen, Hamburg, Heidelberg, Homburg (Saar), Kiel, Cologne, Mainz, Marburg, Munich, Muenster, (Westphalia), Tuebingen, and Wuerzburg. The medical faculties of some of these universities are able to look back upon a long honourable history.

Certain conditions have to be fulfilled before a student may begin to study medicine at a German university. Each student must be in possession of a final testimonial from a higher school, certifying his maturity for the university. This is normally obtained after 9 years at a higher school, and depends on his passing of the Final School Examination, or Abiturium, normally at the age of 19. The German higher school is not identical with the American high school, as its curriculum includes the first years of the American college.

A second prerequisite for the study of medicine is a knowledge of Latin, and will have to be testified if this language has not been taken at the higher school. In their insistence on this ruling, the faculties as well as the profession maintain that there can be no doubt that a certain knowledge of Latin is essential to the future doctor, especially with reference to medical terminology.

Finally, the new regulations of 1953/58 insist on 8 weeks' nursing experience, which the would-be medical student must have acquired prior to commencing his training. This requirement is designed to achieve a dual purpose: on the one hand, the future doctor should be familiar with the fundamentals of nursing skills, for nothing is more humiliating when a highly trained and qualified medical man finds himself unable to apply a proper bandage, straighten a bed, or give an enema. But on the other hand, it is even more important for the young medical student to have early contact with sick people, so that the glamour of his chosen profession should betimes be tempered in his mind with experience of the sordid side of the coin, the ugliness of disease and the misery of suffering. These 2 months on the wards may indeed become a challenge to the young student to consider once more his decision to take up the study of medicine.

These conditions fulfilled, the young student can now begin his training, normally at the age of 19, and certainly not later than 20. He may attend at any of the universities, the selection depending entirely on his own free choice and preference. In addition, it is customary to move from one faculty

to another at least once in the course of the training period. This tradition, which is almost unknown in other countries, cannot be too highly recommended, making it possible for the student to choose his own teachers, and encouraging a critical attitude and reliance on his own judgment.

Undoubtedly, this generosity and freedom of academic life has disadvantages. There is, for instance, no selection of applicants to study medicine, and no limit to the numbers accepted. There are no restrictions of this kind in Germany.

In consequence of this policy, there is a considerable discrepancy in the numbers of students attending various universities. The allotment of students to each faculty would be irreconcilable with German academic traditions.

This failure to limit the admission rate of medical students to the universities has justly met with some bitter criticism in recent years. The medical faculties today no longer have the facilities in terms of lecture theatres, laboratory accommodation, hospital beds, etc., to justify unrestricted enrollment. The problem becomes especially pressing when high birth-rate years come to matriculate. It is for this reason that some of the medical faculties have, in fact, now introduced a certain limit on the number of new students admitted. The University of Bonn, for instance, has restricted the number of new entrants for the summer semester of 1961 to 250 as proper instruction in dissecting rooms and physiological laboratories can no longer be guaranteed if this figure is exceeded. But, normally, the faculties attempt to reduce the unduly large enrollment figures by means of exacting examinations after the first years, designed to eliminate the unfit as early as possible.

The new regulations have introduced no changes as to the length of the course. As before, a minimum of 11 semesters (5½ years) is obligatory. Of these, 5 semesters are set aside for the preclinical, and 6 for the clinical part of the course. Although candidates must show proof of attendance at certain lectures and courses before being admitted to examinations, the medical faculties have complete freedom in the detailed design of their teaching programme. Originally, it has been planned to introduce a fixed time table, modeled on the American teaching system. This had in fact been demanded by the profession, but the plan was eventually abandoned, for legal reasons, conflicting, as it did, with fundamental principles (grundgesetz). Again, the outcome of the controversy was a compromise between the school system of the rigid time table, and the liberal concept of the freedom of academic teaching and learning.

The number of obligatory lectures is not too large, so that the student is at liberty to attend other courses and sessions of his own choosing, which are not compulsory. He is, in addition, encouraged to broaden his view by attending lectures in other faculties of the university.

Only the broad policy, but not the details of the teaching programme in the individual subjects is laid down. Each professor has absolute freedom in developing the structure of his courses. Thus, the student is likely to be presented with similar problems within the framework of different disciplines and might, for instance, encounter the principles of cytobiology 2 or 3 times in zoology, botany, and anatomy. This can, of course, be of considerable advantage, as it demonstrates to the student the existence of different points of view, and encourages him to develop his critical faculties. Of considerable value, in this context, are the joint

lecture-demonstrations or colloquia. In these, a clinical problem is presented and discussed with the students by several teachers of the faculty, bringing the knowledge and attitudes of their special disciplines to the debate. The student soon learns that by no means all the problems of his subject are cut and dried, and that there are often differences of informed opinion even on matters of fundamental importance. These joint lecture-demonstrations and discussions enjoy considerable popularity, especially during the clinical years.

An important innovation in the structure of the course has been the introduction of a Science examination at the end of the second semester (after the first year). In contrast to the practice in other countries, in Germany the natural sciences form a part of the medical curriculum. These subjects (botany, zoology, chemistry, and physics), however, are taught by natural scientists and not by members of the medical teaching staff. Beside the natural sciences, the first-year curriculum also comprises some study of anatomy, both in the lecture room and at the dissecting table. As mentioned above, at the end of the second semester, that is the first year, the student now has to submit to an examination, the so-called "Vorphysikum," when he has to give an account of his knowledge in the basic sciences. This brings German teaching practice closer into line with that in other European countries, so that it is easier for the German medical student to spend one or two semesters at foreign universities.

After passing this "premedical" examination which calls for a relatively high standard, the student now enters his third semester when lectures and practical courses in physiology and biochemistry are added to those in anatomy. Three semesters later, the student may present himself for the next examination, known as the "Physikum." This is an oral examination in anatomy, physiology, and biochemistry. If he satisfies his examiners, he has now concluded his preclinical studies in 5 semesters (2½ years), and is ready to begin his medical training proper. Up till now, he has no contact with patients, except during his 2 months' nursing service.

This long period of preparation leading up to the clinical part of the course is probably unavoidable. Whether the student should be introduced to pathological phenomena already during his preclinical training, and if so to what extent, remains a matter for debate. Some experiments in this direction are at present being carried out in the U.S.A., for instance at the Western Reserve University, in Cleveland, but the results are not yet known. In Germany, no such experiments have been planned to date.

The new regulations have not changed the prescribed period for the clinical course, which is still 6 semesters—i.e., 3 years. No very fundamental changes have been introduced in this part of the training. As before, the "major lecture" with case demonstrations forms the focal point of clinical teaching, and is given by the professor or senior lecturer in the subject concerned (known as Ordinarius = full professor). It is a peculiarity of German academic life that in each subject there is only one regular professorial chair, occupied by the Ordinarius. Rare exceptions to this rule might include general medicine. The Ordinarius is in addition in charge of 300 or more clinical beds, and responsible for the work of departmental chiefs and other doctors under his jurisdiction.

This grand lecture-demonstration is old-established tradition, and formidable reasons are justly brought forward why it should not be broken. It is said, for

instance, that in this manner, the student receives his information at first hand and in a masterly fashion from the leaders of his chosen profession, while at the same time he gains the opportunity of meeting a famous man. Desirable as this form of teaching may be for reasons of this kind, there are also important considerations against it. There can be little doubt that teaching at the bedside, ward rounds, discussion groups, and demonstrations are of greater value in the practical training of the future physician. In addition, it can hardly be expected that every one of these grand lectures is indeed delivered in a truly masterly manner. Not every great physician and research worker is necessarily a good lecturer. From this point of view, the American mode of teaching might appear to be superior.

That this has now received undoubted recognition in Germany is witnessed by the fact that in a number of faculties teaching in small groups is becoming increasingly popular side-by-side with the grand lecture demonstration. Classes of twenty or 30 students meet to discuss diagnostic and therapeutic problems, and seminars as well as ward rounds are becoming a feature of tuition. The student is no longer to remain merely a passive listener, but becomes actively integrated into his own clinical training. To these "modern" features of the clinical training are added certain obligatory courses, designed to teach the student standard diagnostic and therapeutic procedures, such as a course in percussion and auscultation, courses in ophthalmological and gynecological examination, a course in obstetric techniques, and so on.

In the main, there is now agreement among the authorities concerned that, given the opportunity of a further reform in the structure of the clinical training, even more time and scope should be allotted to teaching at the bedside in small groups than is the practice already. Yet, the grand lecture demonstration from the major professorial chairs should by no means be abandoned. In addition, it is generally agreed to retain and, in fact, elaborate the formal introductory lectures with case demonstrations in the chief subjects (medicine, surgery, gynecology), so as to equip the student with the fundamental concepts of disease processes and notably with medical terminology, before he goes to attend the major lectures. Thus, although the German medical faculties show themselves to be conservative in refusing to abandon old traditional teaching methods, they yet demonstrate a progressive spirit in promoting the integration of valuable new ideas and techniques into training policy.

From the 6th to the 11th semester, theoretical and clinical subjects are taught side-by-side. The course begins with morbid anatomy, soon to be followed among others by pharmacology, forensic medicine, public health, and industrial medicine, and the history of medicine. Instruction in the theoretical disciplines continues throughout the training and is thoughtfully integrated into the general plan along with the clinical lectures, collegia, and ward rounds.

At the end of the 11th semester (i.e., after 5½ year's study), the student may present himself for the so-called State Examination. This marks the end of his student days, but by no means the end of his medical training. In Germany, this final examination is held by the State, in contrast to other countries, such as Austria and Great Britain, where it remains the responsibility of the university or faculty (or of the Royal Colleges in Great Britain). Although the actual examination is con-

ducted by the professors of the medical faculties, the examination committees are appointed by the State and confirmed by the Ministry. Unlike the practice at American universities, there are no final examinations at the end of each semester in Germany. Throughout the whole of his training, the student has to face only three examinations: the examination in the basic sciences (Vorphysikum), after the first two semesters, the preclinical examination (Physikum) at the end of the 5th semester, and the final medical examination (Staatsexamen) after 11 semesters on conclusion of his studies. He is, therefore, expected to be able to give an account at the State Exam. of everything he has learned during the last 3 years of his training. To have all that knowledge ready for his examiners certainly imposes a considerable strain on the student.

The Final Examination (Staatsexamen) generally extends over 3–4 months. The new regulations of 1953/58 have reduced the number of separate subjects in which exams are held to twelve. Formerly, there had been up to nineteen. At present, the examination is subdivided into the following parts:

1. Morbid anatomy and general pathology
2. Pharmacology
3. Hygiene, medical microbiology, and public health
4. Forensic medicine, insurance medicine, and medical jurisprudence
5. General medicine
6. Surgery
7. Obstetrics and Gynecology
8. Pediatrics
9. Dermatology and venereology
10. Ophthalmology
11. Diseases of ears, nose and throat
12. Psychiatry and neurology.

In the theoretical subjects, the examination takes the form of a *viva voce* encounter with the examiner, when the candidate is expected to display his knowledge of the subject concerned in the course of discussions lasting several hours. In the clinical sections, the candidate is examined at the bedside, and later also during an oral discussion. Several days, sometimes up to a whole week, are set aside for each of the major subjects, that is, medicine, surgery, and gynecology. The candidate has to examine one patient on each of 2 consecutive days, in the presence of the examiner. He is expected to take a history, make a diagnosis and prognosis, and design a treatment programme. Finally, he furnishes a written report on his findings complete with a critical evaluation of the case. In addition, he will be asked to examine other patients, more briefly, and to demonstrate his general familiarity with the subject in the course of a *viva voce* conversation with the examiner.

In obstetrics, the candidate is expected to examine a woman in labour in the presence of the examiner, and to express an opinion on the state of the labour, the position of the fetus, the prognosis and any therapeutic measures that might be indicated. He may find himself involved in the practical management of the labour, and may be asked to perform obstetric maneuvers. Here, too, he has to submit a written report on the course of the labor. In the remainder of the clinical subjects (pediatrics, dermatology, psychiatry, ophthalmology etc.) the examination is conducted in a corresponding manner, 1 or 2 days being allotted, depending on the importance of the subject for the practicing physician.

In case of failure, the student may repeat the state examination only once. This constitutes an innovation, as under the old regulations it had been possible to attempt the final examination three times.

In Germany, the degree of Doctor of Medicine is not conferred, as in some other countries (e.g., Austria), automatically on passing the State Examination. A further examination is required, prior to which the candidate must have written, unaided, a scientific paper on some medical problem. Subsequently he is examined orally in three medical subjects. This examination is set by the faculty and not by the State, so that the degree of Doctor is not a *sine qua non* for permission to practice. All the same, it is most unusual for students not to attempt this further hurdle, and obtain the degree of doctor, if only for reasons of prestige. As in other countries, in Germany, the title of Doctor is synonymous for the layman with that of physician. Considerable pressure has been, and is still being exerted from various quarters in Germany, to abolish the Doctorate examination, and to confer the degree automatically on successful candidates at the State examination. So far, however, the faculties have not been able to see their way to taking such a revolutionary step.

The State examination, as we have already mentioned, brings to an end the years of formal study, but this does not mean that the student has now completed his training. The future doctor cannot equip himself adequately for the practice of his profession through university courses alone, but he must now consolidate his knowledge through practical experience on the hospital wards. The new regulations demand that the student should have had 3 months' active hospital experience even before he presents himself for the State Examination. He is expected to serve this time as "famulus" on the wards during the academic holidays. This obligatory period of clinical apprenticeship used to be 6 months, but has now been reduced to 3 months. It might be mentioned in passing, that many of the students elect to serve as clinical clerks or dressers for more than the required 3 months.

To compensate for this reduction in the pre-qualification apprenticeship, the new regulations now demand from the young doctor a 2-year period of postgraduate medical assistantship, as against only 1 year as previously. This doubling of the practical training period has been one of the most dramatic changes brought in with the new regulations. The training period of the German doctor has thus been extended from 6½ to 7½ years, which brings it in line with established custom in many other countries. The Medical Assistant (Medizinalassistent), as the young doctor is now called, is expected to spend 6 months of his practical training period working in the general medical department of a hospital, and 4 months each in surgery and in gynecology and obstetrics. The remaining 10 months may be spent working in a department of his own choice.

The medical assistantship need not be served at a university clinic, which in any case would be unable to accommodate all the recently qualified students. Other large hospitals, private clinics and sanatoria, are also available for training purposes. It should, however, be noted, possibly as a matter for regret, that in Germany the practical training period of the medical assistant is not planned and supervised as systematically, as, for instance in America, where the practice of the rotating internship warrants contact with all the individual disciplines. More recently, principles for the selection of hospitals and the instruction of medical assistants have been laid down in Germany by the Medical Councils, the faculties, and the Association of Consultant Physicians. In the course of his practical activities as Medical Assistant, the young doctor is expected to

attend at least one public session of vaccinations and follow up examinations.

On completion of his 2 years' medical assistantship, 7½ years after commencing his medical training, the doctor now receives from the State his approbation, —i.e., permission to practice medicine independently anywhere within the Federal Republic. This finally marks the end of his training.

The refusal, on principle, to limit the number of applicants for admission to the medical faculties, has, as has been mentioned already, given rise to a situation at the German universities, which is causing the authorities considerable concern. It is quite impossible for existing facilities in terms of anatomical dissecting rooms and laboratory space, to accommodate the flood of prospective students pressing for admission. Nor are there enough clinical beds or sufficient teaching personnel to meet the growing needs. Thus, for the winter semester of 1960/61 (November, 1960, to February, 1961) the University of Bonn had 1607 medical students on its books, to which were added 252 dental students. Other universities are even more popular, such as the University of Munich, where 2907 medical students were registered during the winter semester 1959/60, about 1400 of which were in their clinical semesters. At the smaller universities, such as Kiel and Giessen, students are correspondingly fewer in number (879 and 478 medical students, respectively). The total of all medical students registered at the universities of the German Federal Republic at the beginning of 1960 amounted to 20,953.

Considerable damage is done by the overcrowding of the laboratories and clinical departments, not only because the quality of the teaching is bound to suffer, but also by virtue of its effect on research, which is closely linked to teaching at the universities. The shortage of scientific collaborators is bound, in the long run, to result in neglect of important areas of research at the university clinics. It is for this reason that the Scientific Council, the supreme authority for the promotion of science in Germany, has just published a comprehensive plan, which also includes recommendations for the development of the medical faculties and university clinics.

The fundamental principle which forms the basis of these recommendations is the close interdependence of research and teaching. There must be no medical schools without research departments. Each seat of learning should comprise such a basic complement of professorial chairs as to satisfy the traditional standards of the versatility of university education, so far as this can still be achieved under modern conditions. It might be desirable for individual universities to adopt one or the other subject as their specialty.

Again, the restriction of the numbers of students admitted to the universities is not one of the recommendations made in this plan. On the contrary, it is urged that facilities should be extended so that all those seeking an academic education may be served, and existing restrictions on admissions and selection of subjects studied should be rescinded. It is recommended to create new universities and medical faculties in order to meet the growing demand for a higher education, and the existing body of academic teachers should be greatly reinforced. Special emphasis is placed on the desirability of increasing the number of professorial chairs, and to duplicate chairs, if necessary in the busier departments. In all, the Science Council recommend the establishment of 1200 new professorial chairs for all faculties, including that of medicine.

A basic complement of professorial

Theoretical subjects:	Chairs
Anatomy	2
Physiology	2
Biochemistry	2
Pathology	2
Public Health	1
Microbiology	1
Pharmacology and Toxicology	2
Medical Radiology	1
Genetics	1
Medical Jurisprudence	1
History of Medicine	1
Total	16

Clinical subjects:	
General Medicine	3
Surgery	2
Orthopedic surgery	1
Neurosurgery	1
Gynecology	1
Psychiatry and Neurology	1
Ophthalmology	1
Dermatology	1
E.N.T.	1
Pediatrics	1
Radiotherapy	1
Total	14

chairs is envisaged for each medical faculty, if the faculty is to keep pace with the advances in medical science. Thus:

With, in addition, chairs of dental surgery.

A faculty which incorporates the basic complement of professorial chairs will be able to train 100 students per semester in the preclinical, and 70 students per semester in the clinical years.

It is one of the recommendations of the Science Council that size and organization of a university clinic should be adapted to the needs of its research functions. But it is thought even more important for the faculty to be able to provide the highest standard of medical education for its students and postgraduates. The professor must be in a position to maintain the closest contact with his students who, in turn, must be given every opportunity of consolidating and extending the theoretical knowledge gained through practical experience and hard work at the bedside. The establishment of mass production methods in medical education must be avoided at all cost.

To ensure good and regular clinical experience for all students, the Science Council estimates that in the major subjects (medicine, surgery and gynecology), three to four beds per student are required, and a large enough number of beds per clinic should be provided to meet this need. Nothing short of this standard can be considered as adequate in offering the facilities necessary for the intensive experience which only immediate contact with the patient can bring. But even so, the tradition of the grand lecture demonstration should not be abandoned, as—in its modern form—it will still form an essential item on the medical training programme.

Taking all relevant factors into account, the Science Council has recommended an optimal number of beds for each individual clinic. Thus, medicine, surgery, and gynecology should have 200 beds each; orthopedic surgery, 100–150 beds; neurosurgery, 60–80 beds; the neuropsychiatric clinic, 200 beds; the eye, skin, and E.N.T. clinics about 100 beds each; and the pediatric department 200 beds. A corresponding number of beds are to be provided for the smaller, independent departments, such as the wards associated with the radiotherapy clinic. If, however, three to four beds per student are to be allowed, then these figures will not be sufficient to cater for an intake of 70 new students per semester. It is, therefore suggested to start by providing 400 beds each in the medical and surgical departments (in addition to isolation, T.B., and casualty beds). This may be done either by associating other local hospitals with the clinics, or by simply building a second university clinic. It would then be possible, under present conditions, to provide proper training at the medical

faculties of the Federal Republic for roughly 16,000 students.

This figure, however, falls considerably short of present numbers and future estimates. It will therefore be necessary, in some university towns to enlist the help of even further hospitals to provide more than 400 beds for the major departments, so that the capacity of 70 new students per semester can, if necessary, be exceeded. The alternative, according to the Science Council, is the creation of independent Medical Academies, that is, Medical Schools, which would not belong to any university. In this context, the Council also proposes to examine the question of a more equable distribution of students to individual medical faculties. This would, of course destroy one important feature of German university education, namely, the freedom to select the university where a prospective student wishes to be trained.

Finally, we would like to say a word about medical research, although it does not strictly come within the orbit of our subject of medical education. Research has not been forgotten in the recommendations of the Science Council. They clearly formulate their conclusions that—if Germany is to come abreast with the progress of medical research in other countries—it will be necessary to establish centers for the development of special research programmes within the framework of the medical faculties.

For the deployment of such centers, certain suggestions are put forward. Thus, Frankfurt is to be the special center for research in chemotherapy. Cancer research should be centered in Heidelberg, tuberculosis research in Bonn and Freiburg, rheumatology in Mainz and Marburg, clinical endocrinology in Cologne, cardiology in Berlin, Bonn, Duesseldorf, Goettingen, and Munich, and so on.

These truly generous proposals for the reform of medical education in Germany have so far not progressed beyond the blueprint stage. Whether and to what extent it will be possible to make them come true, is largely a matter of finance. The necessary means will have to be provided by the State, as all the German universities are state-owned and a responsibility on public funds. But there can be no doubt that these far-seeing plans show the way which German medical science will have to go if it is to regain its former reputation in the fields of research and the training of medical men.

The Medical Schools in the Republic of Ireland

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SUMMARIO

Il ha 5 scholas medical in le Republica de Irlanda: 4 scholas universitate (le universitates de Dublin, Cork, Galway, e Universitate Trinitate, Dublin) e uno non-universitate (le Collegio Royale de Chirurgos). Le cursos requirite de instruction seque le mesme patrono general in omnes. Studentes entra usualmente ab schola secundari e passa 6 annos academic in le schola medical; le prime anno, le "pre-medical," se dedica al studio del scientias basic. Le studente debe subir successosemente un examine in cata subjecto ante que on le permitte de registrar como un studente *medical*. Le prime anno del curso medical ipse, e 2 terminos del secunde, son passate in le studio de anatomia, physiologia, biochimia, e histologia; examines in cata uno de iste subjectos seque. Le studente comencia alora le studio de pharmacologia, pathologia, e bacteriologia, como anque su assistentia formal al hospital. Instruction hospitalari (inglobante practica general, obstetricia, gynecologia, pediatricia, e altere ramos special) es continue usque le examine final; un total de 33 menses es requirite. Durante le 2 ultime annos, on da instruction in sanitate public, medicina preventive e social, e jurisprudentia medical. Post que ille ha passate le examines final, le studente es registrate provisionalmente con le Consilio Registration Medical de Irlanda (qualunque medico qui desira practicar debe esser si registrate) le qual permitte que ille practica in un hospital recognoscite sub le supervision de clinicos senior. Al fin de un anno, e providite que su obra ha essite certificate como satisfactori, su nomine as entrate officialmente in le Registros del Consilio e ille es licentiate a practicar. Post revider iste patrono general de education medical in Irlanda, on presenta un reporto detaliate de cata uno del 5 universitates medical, inglobante lor historia, organisation, curriculo, methodos de inseniamento e de practica hospitalari, corpores de examine, lor systema de confere grados supere, etc.

GENERAL INTRODUCTION

A doctor wishing to practise in the Republic of Ireland with the normal legal recognition must have his name entered on the Register of the Medical Registration Council of Ireland. Persons not so registered may and do advise patients on matters of health, but they are at certain disadvantages. Certificates signed by them are not legally valid, they may not be able to recover fees by legal action, and if a patient dies following their treatment they may be faced with a criminal charge.

The Medical Registration Council admits to its Register holders of qualifications from the following Irish bodies, provided they have completed 1 year of internship in one of the recognised hospitals subsequent to receiving the qualification:

The National University of Ireland, which confers the degrees of Bachelor of Medicine, Bachelor of Surgery, and Bachelor of Obstetrics, M.B., B.Ch., B.A.O.

Dublin University, which confers the degrees of Bachelor in Medicine, Bachelor in Surgery, and Bachelor in Obstetrics, M.B., B.Ch., B.A.O.

The Royal College of Physicians of Ireland and the Royal College of Surgeons in Ireland, which grant the licences of the Colleges and their licences in Midwifery, L.R.C.P.I., L.R.C.S.I., L.M.

The Apothecaries' Hall of Ireland, which grants its licence, L.A.H.

By legal agreement the Council also admits to its Register graduates of uni-

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versities and other licensing bodies in the United Kingdom of Great Britain and Northern Ireland who are admissible to the Register of the British General Council of Medical Education and Registration (commonly called the General Medical Council—the G.M.C.), and also of certain universities in certain Commonwealth countries who are so admissible. This agreement is reciprocal, so that in general anyone whose name appears on either register can practise medicine in both countries.

The Apothecaries' Hall of Ireland takes no part in the instruction of medical students. For admission to its examinations it accepts certificates of attendance at courses recognised by it in the relevant subjects. The other three licensing bodies in the Republic of Ireland are associated with five medical schools.

The National University of Ireland has three constituent university colleges: University College, Dublin; University College, Cork; and University College, Galway; and each of these has a medical faculty. The medical degrees of the National University of Ireland are open only to those who have received their medical education at one of these schools.

The School of Physic, Trinity College, Dublin, is the medical school of Dublin University, and the medical degrees of the university are open only to students of that school.

The licences of the Royal Colleges are conferred on those who have passed the examinations of the Irish Conjoined Board. This is an examining body composed of three representatives each from the Royal College of Physicians and the Royal College of Surgeons. It conducts all the professional examinations formally required by the Irish Medical Registration Council and the General Medical Council. These examinations are taken for the most part by students at the Medical School of the Royal College of Surgeons in Ireland, but they are open to other students who can produce evidence of having attended recognised courses in the relevant subjects.

The pattern in the National University of Ireland and in the University of Dublin is, therefore, the same as that with which one is familiar in universities in other countries. A student attends courses of instruction in the university or one of its constituent colleges, takes the examinations conducted by the university, and receives a registrable qualification from that university. In the case of the Royal Colleges the plan is more complicated. Each of these colleges has a responsibility for maintaining the standard of practice in its own branch of the profession at a high level, and each does this by conferring its membership or fellowship on registered practitioners who have passed the higher examinations held by the colleges. The Royal College of Surgeons, in addition to this task, has a full undergraduate medical school, the Schools of Surgery. The College is responsible for every aspect of the teaching in that school and for the appointment of all the teachers except the professors of Medicine, Midwifery, and Pharmacology, who are nominated by the Royal College of Physicians. Class and other informal examinations taken by the students in the Schools of Surgery are organised by the Royal College of Surgeons, through the teachers in the various subjects as mentioned above; professional examinations are organised by the Conjoined Board. In each professional examination there are normally at least two examiners, an intern and an extern. The intern examiner is appointed by the Royal College of Surgeons, and he is normally the professor in charge of the subject; the extern examiner is appointed from some outside source by the Royal College of

Physicians, except in the case of the final examination in Surgery, when the extern examiner, as well as the intern, is appointed by the Royal College of Surgeons.

To summarise: there are five medical schools in the Republic of Ireland, four university schools, those of the University Colleges of Dublin, Cork, and Galway, and Trinity College, Dublin, and one non-university school, that of the Royal College of Surgeons in Ireland. There are four examining bodies, two of which are universities—namely, the National University of Ireland and the University of Dublin, and two non-university bodies—namely, the Irish Conjoined Board and the Apothecaries' Hall. The universities examine only their own students, but the non-university examining bodies examine any students who have completed the required courses, including students from either university, though the Irish Conjoined Board is concerned mainly with the students from the non-university school of the Royal College of Surgeons in Ireland. There are five qualifying authorities—i.e., five authorities the qualifications of which are recognised for purposes of registration, the two universities, the Royal Colleges of Physicians and Surgeons, and the Apothecaries' Hall. The licences of the Royal Colleges are only registrable jointly.

The courses of instruction which medical students are required to take follow the same general pattern in all the schools. Students usually enter from a secondary school at about the age of 18 years and spend 6 academic years in the Medical School. Each academic year consists of three terms of about 10 weeks each. The first year, called the premedical year, is spent in the study of the basic sciences, chemistry, physics, and either botany and zoology or biology. An examination must be passed in each of these subjects before the student can be registered as a medical student. In exceptional circumstances a student may be granted exemption from the premedical subjects and examinations.

The first year after registration as a medical student and the first 2 terms of the second year are spent in the study of anatomy, physiology, biochemistry, and histology. At the end of this period of five terms a professional examination in these subjects must be taken. The student then commences the study of pharmacology, pathology and bacteriology and his formal attendance at hospital. The organisation of instruction in pathology and bacteriology varies somewhat from school to school, but in general it extends over about six terms. The course in pharmacology usually occupies about two or three terms. Hospital instruction, which includes general hospital practice, midwifery, gynecology, pediatrics, ophthalmology, orthopedics, otorhinolaryngology, and other special branches, is continuous till the final examinations are taken—a total of 33 months being required. During the last 2 years the student receives instruction in public health, preventive and social medicine, and medical jurisprudence.

Hospital attendance during the 3 clinical years is apportioned roughly as follows: During the first clinical year the student attends a general course in medicine and surgery in his teaching hospital. Toward the end of that year he will probably do periods as clinical clerk and surgical dresser with consultants in the hospital. In the second clinical year he must attend clinical instruction in a number of special subjects, e.g., pediatrics, midwifery, infectious diseases, as well as devoting as much time as possible to his general hospital work. This process is continued into the final year, during which he should spend a period as an undergraduate resident in his general

hospital, if he has not done so before.

There are ten general teaching hospitals in Dublin: the Adelaide Hospital (165 beds), Dr. Steevens' Hospital (200 beds), Jervis Street Hospital (240 beds), the Mater Misericordiae Hospital (450 beds), the Meath Hospital (260 beds), Mercer's Hospital (120 beds), the Royal City of Dublin Hospital (190 beds), St. Laurence's Hospital (360 beds), St. Vincent's Hospital (205 beds), and Sir Patrick Dun's Hospital (170 beds).[1] All these hospitals were founded during the period between 1720 and 1861; and in each case the capital required was raised by voluntary effort. Each hospital depended to a considerable extent on voluntary subscriptions for its support until its entry into the Irish Sweepstakes Scheme. The Mater Misericordiae Hospital and St. Vincent's Hospital are owned and managed by nursing orders of nuns. St. Laurence's Hospital is associated with the Department of Health. Sir Patrick Dun's Hospital, as will appear later, was established as the clinical hospital of the Trinity College Medical School and the Provost and certain officers of the Royal College of Physicians of Ireland are *ex officio* governors, other members of the Board of Governors being elected to represent the voluntary subscribers. All the other hospitals are independent voluntary units.

The three medical schools in Dublin have varying associations with these voluntary teaching hospitals. University College, Dublin, is closely associated with the Mater Misericordiae Hospital and St. Vincent's Hospital, and the great majority of their students attend either of these hospitals. The great majority of students from Trinity College are distributed between Sir Patrick Dun's, the Royal City of Dublin, the Meath and the Adelaide Hospitals. Nearly half of the students of the Royal College of Surgeons go to St. Laurence's Hospital, and the remainder are distributed between Jervis Street, Mercer's, the Royal City of Dublin, the Adelaide, and the Meath Hospitals. Where the students of more than one school attend any particular hospital, there is an agreement about relative numbers, so that the hospital is not expected to take more students than the bed complement would justify.

Dublin has also three maternity hospitals, three children's hospitals, an Eye and Ear Hospital, and a mental hospital, each under voluntary control, and two fever hospitals and a mental hospital under Health Authority control, all of which are available for the instruction of medical students, and most of which accept students from all three schools.

The arrangements for clinical teaching in Cork and Galway are much simpler, because there is only one medical school in each of these centres.

The staff structure of a typical Irish medical school department is very like that of a similar department in Great Britain. There is usually one professor, who is the head of the department, and a reader or senior lecturer, who is an experienced teacher with a substantial research record. Some departments have two or more members with these titles, and they correspond roughly to associate professors in an American department. A lecturer is roughly equivalent to an assistant professor in an American university, and the number of lecturers in an Irish medical school department is usually between one and five, depending on the size of the department. Staff numbers are, therefore, much smaller than are current in American schools, but it should be noted that in this country workers whose support comes from sources outside the university are not

[1]The bed complement numbers in brackets are approximate.

usually included in the staff of the department in which they work, even if they take some small share in teaching.

Examinations in the Irish medical schools, as in other centres recognised for purposes of registration by the General Medical Council, are conducted quite formally. They consist of a written and an oral section and, where appropriate, a practical or clinical section. The minimum mark required for a pass is 50 per cent in all cases, and marks much above 75 per cent are unusual. The student's performance in class is taken into account, but the weight usually given to it is not very great. A student would be unwise to count on a show of diligence in class making up for a poor mark in the examination. In all major examinations the head of the department, who is the intern examiner, has the assistance of a senior teacher from some other school, who acts as extern examiner. Other members of the department may take part in the examination. The decision to pass or fail is taken jointly by all the examiners concerned.

When the student has passed the final examinations he is registered provisionally. This enables him to practice in a recognised hospital where he is under the general supervision of senior clinicians. At the end of a year of such practice, his name is placed on the register, provided that his work is certified as having been satisfactory.

THE MEDICAL SCHOOLS OF THE NATIONAL UNIVERSITY OF IRELAND

History of the National University of Ireland.—The National University of Ireland is the outcome of a long struggle to secure from the state a system of university education acceptable to the Roman Catholic Church in Ireland. While the Penal Laws were in full force, Roman Catholics, and indeed all denominations outside the Established Church, whether in Great Britain or Ireland, were denied access to the universities. These laws bore more heavily on Roman Catholics than on Protestant nonconformists, and they were enforced more rigorously in Ireland than in England.

The only university in Ireland prior to the 19th century, Trinity College, or the University of Dublin, was opened to Catholics through the Catholic Relief Act of 1793. From then onward, Catholics (and Protestant nonconformists) could enter, and graduate in, the University of Dublin. However, fellowships and scholarships continued to be restricted to members of the Established Church, and this fact, together with the disapproval of Trinity College by the Irish Catholic Hierarchy and the relatively high cost of university education, meant that only a small minority of Catholics from the well-to-do sections of the community took advantage of the opportunities offered by Trinity. In 1873 an Act of the British parliament, generally known as Fawcett's Act, removed all legal disabilities on Catholics in Trinity College.

In the 40's of the 19th century the British government instituted a new system of university education, intended to cater for both Catholics and Protestant nonconformists on a nonsectarian basis. Three "Queen's Colleges" were established, at Belfast, Cork, and Galway, empowered to provide university teaching in Arts, Law, and Medicine; and in 1850 a new university, the Queen's University in Ireland, was set up as a degree-granting authority for the three colleges. The colleges were forbidden to use their public endowment for the teaching of religion, and both their staffs and their students were entirely free from religious tests. For these and other reasons the colleges were condemned by the Catholic Hierarchy, and

insofar as the Catholic populations was concerned, they never fulfilled the expectations of their founders.

Disappointed with the Queen's Colleges scheme, the Catholic bishops founded a university of their own in Dublin in 1854, under the rectorship of John Henry Newman, later Cardinal. This university, the Catholic University of Ireland, was crippled both by lack of state support and by lack of state recognition, but it managed to survive on the fees of students and on the voluntary contributions of Irish Catholics. The medical school (in St. Cicilia Street) suffered least from the lack of chartered rights, because its students could become licentiates of the Royal Colleges of Physicians and Surgeons. It was the most vigorous and successful part of the Catholic University and preserved an unbroken existence down to 1908, when it was taken over by University College, Dublin.

The Queen's University was replaced by the Royal University in 1879, and from that date medical students of the Catholic University Medical School could either take the licences of the Royal Colleges in Dublin or the degrees of the new university. About the same time, after an effort lasting nearly 30 years, the Catholic University became University College, under Jesuit management; but the students in the Medical School maintained their association with those of the new College. Although facilities must have been sadly restricted for lack of funds, the Medical School seems to have been managed efficiently, and its teachers to have been imbued with considerable enthusiasm, so that a good standard was reached. Eventually, in 1908, after unsuccessful attempts to devise an Irish University which would provide facilities acceptable to Catholics and at the same time would include Trinity College, the National University of Ireland was established. Three constituent University Colleges—the Queen's Colleges of Cork and Galway and University College, Dublin—formed the new body, which was quite separate from Trinity College.[2] The Medical School of the Catholic University came under University College, Dublin, in the new regime. The National University was—and is—in law a "neutral" university, and like the Queen's Colleges, may not use its public endowment for the teaching of religion. However, the transfer to it of University College, Dublin, gave grounds for the expectation that its atmosphere and the personnel of its staff would be acceptable to Catholics, and this expectation has, in fact, been fully realised.

The administrative offices of the National University are in Dublin but are quite separate, both geographically and functionally, from University College, Dublin. The highest university authority is the Senate, which includes representatives of the Colleges and of the graduates of the University, as well as members nominated by the government. It is responsible for the appointment of senior teaching staff and for the arrangements for degree and other university examinations; but the Colleges appoint their junior staff and have considerable autonomy in the organisation of courses and in the provision of amenities for their students. The President of each College serves in turn as Vice-Chancellor of the University.

THE MEDICAL SCHOOL OF UNIVERSITY COLLEGE, DUBLIN

Historical.—There is little to be added to what has been said about University College, Dublin, in the above account of the National University of Ireland. The

[2] Queen's College, Belfast, became the Queen's University of Belfast, which is quite autonomous.

transfer of the College to the new university seems to have made little physical difference to the Medical School for some time. Departments were only gradually moved to the same building as the College, over a mile away, and it was not till 1932 that the Anatomy department, the last to go, left the premises in which it had started in 1855.

Following the establishment of the National University of Ireland, the buildings of the Royal University were allocated to University College, Dublin. They included a number of large halls that had been built to house an exhibition some years before. Plans were drawn up for a new building, and during World War I a handsome frontage was erected. Unfortunately, work did not proceed any further, and many of the old halls remain to the present day. The College offices and teaching departments were accommodated on this site, and the nearby houses which the College had hitherto occupied became the Students' Union, the centre of the social activities of the students. After the cessation of British rule in Ireland the Royal College of Science and the Albert Agricultural College, which had been administered by the Ministry of Agriculture, were transferred to University College. The laboratories of the College of Science, situated about ½ mile from University College, provided accommodation for the new College's departments of chemistry, botany, and zoology, and the Albert College, with its farm of about 350 acres about 4 miles from University College, furnished the latter with a ready-made department of agriculture.

When the new premises for University College were being planned the estimated complement of students was 1,000. At first growth was not rapid, and, with the acquisition of the College of Science and the Albert College, accommodation was adequate. However, by the 40's a condition of gross overcrowding had been reached, and with the increasing demand for university education that followed World War II some drastic change became inevitable. A large area of land was acquired about 3 miles from the present College building and 4 miles from the centre of the city, and it is planned to move the entire College to this site as soon as practicable and to provide residential accommodation there. This new property is adjacent to the playing fields which have been in use for some years, the whole area being about 250 acres. Already, some of the existing residences on the new property have been adapted to house the research activities of some of the science departments and a new science block is in process of construction.

The College and Medical School.—At present University College, Dublin, is distributed between five separate sites —the main office and teaching group of buildings, the Students' Union and the Science buildings—all of which are within easy reach of each other and of the centre of the city—the Albert Agricultural Farm and the new property, each of which is in the suburbs about 3 or 4 miles from the central group, the former to the north and the latter to te east (the population of Dublin is about 540,000).

There are over 5,000 students in the College, and its educational scope includes faculties of Arts, Philosophy, and Sociology, Celtic Studies, Science, Law, Medicine and Dentistry, Commerce, Engineering and Architecture, Agriculture and Veterinary Medicine.

Over 100 students, the great majority of whom are Irish, are admitted to the Medical School each year, having completed or being excused the premedical examination in chemistry, physics, botany and zoology. The total number at

present in the School is 596. Instruction in anatomy, physiology, biochemistry, pharmacology, pathology, bacteriology, forensic medicine, and social and preventive medicine is given in the main College buildings. The departments concerned with these subjects have their lecture rooms and teaching laboratories in the main block and their research accommodation in the new estate, with the exception of Pathology and Social and Preventive Medicine, which are entirely on the main site. The Professor of Forensic Medicine is also State Pathologist and has a department equipped to carry out medico-legal investigations which are used to illustrate teaching. The College library includes a well-stocked medical section.

Each of the departments has a full-time staff, the head of which is a professor. The total number of members of the Medical School staff duly appointed by the University or by the College is about 100, and there are, in addition, about 100 recognised teachers who are members of the staffs of the hospitals usually attended by the students of University College.

Clinical instruction is given principally in St. Vincent's Hospital and the Mater Misericordiae Hospital. In each of these hospitals the staff includes a professor of Medicine and a professor of Surgery in University College; and a large proportion of the other staff members hold other posts in the clinical departments of the College. The great majority of students go to either of these hospitals, but some may attend one or more of the remaining Dublin teaching hospitals, all of which are recognised by the College.

The specialist hospitals usually attended by students of University College are: for Midwifery, the National Maternity and the Coombe Hospitals; for Pediatrics, Our Lady's Hospital for Sick Children and the Children's Hospital, Temple Street; for Mental Diseases, St. Brendan's Hospital; for Ophthalmology, the Royal Victoria Eye & Ear Hospital.

The arrangement of the curriculum is very similar to that outlined earlier. Histology is taught in the Department of Physiology. Pharmacology is done for the most part in the third year, and the latter part of the course is correlated with the course in therapeutics. Instruction in social and preventive medicine is given in the last term of the second year and also in two terms of the third year and one term (the last) of the fifth year. In addition to the course of lectures the students visit places and institutions of public health interest. Forensic Medicine is taken in the third year, and the course is illustrated by *postmortem* and other material from medico-legal cases.

Higher degrees.—Graduates of University College, Dublin, are eligible for the higher degrees of Doctor of Medicine (M.D.), Master of Surgery (M.Ch.), and Master of Obstetrics (M.A.O.), of the National University of Ireland. The College also awards a Diploma in Psycological Medicine (D.P.M.), a Diploma in Child Health (D.C.H.), and a Diploma in Public Health (D.P.H.). Special courses of instruction are given for each of the last three qualifications.

THE MEDICAL SCHOOL OF UNIVERSITY COLLEGE, CORK

Historical.—The present Cork Medical School was inaugurated on November 8th, 1849, when Queen's College (now University College), Cork, was formally opened, its medical faculty being one of the foundation faculties of the new institution. There had been earlier medical schools in Cork unattached to any university or other diploma-granting body, and some of these continued until the passing of the Medical Act, which re-

stricted legally recognised medical practice to those who were graduates of universities or diplomates of the Royal Colleges of Physicians and Surgeons.

The first professorships were in Anatomy and Physiology, Medicine, Midwifery, Surgery, Materia Medica, Natural History, Natural Philosophy. A chair in Human and Comparative Pathology was added before the end of the century, and in 1907 the union of Anatomy and Physiology under one professor was dissolved, and separate chairs instituted.

With the establishment of the National University, in 1908, Queen's College, Cork, became University College, Cork, and its medical school continued uninterruptedly under the new regime.

The College and Medical School.—The College buildings are situated in grounds of about 20 acres about 1 mile from the centre of Cork city, (population, 80,000). They accommodate lecture rooms, laboratories, libraries, great hall, museums, including a remarkable collection of reproductions of monoliths exhibiting ogham characters, and students' refectory and recreation room. Playing fields are situted about ½ mile away. The experimental farm of about 150 acres is two miles distant from the College.

In addition to the usual Arts and Science departments, University College, Cork, has professional faculties of Law, Medicine, Dentistry, Engineering, Agriculture and Dairy Science. The total number of students is about 1,500. About 180 of these are medical students who have passed the premedical examinations but have not yet completed the final examination—i.e., about 36 students in each of the 5 years. The selection of these students is made on the results of the premedical examination, the subjects of which are chemistry, physics, botany, zoology, and elementary philosophy. These subjects are studied for a year at University College, though many students have taken some of them, usually chemistry and physics, at school. The clinical part of the course is carried out in three general hospitals, the specialties being catered for in appropriate special hospitals. The general teaching hospitals are the North Charitable Infirmary (120 beds), the South Charitable Infirmary (134 beds), and St. Finbarr's Hospital (683 beds). The special hospitals include the Cork Eye, Ear and Throat Hospital (57 beds), the Erinville Maternity Hospital (40 beds), St. Mary's Orthopaedic Hospital (200 beds), and Cork Mental Hospital. St. Finbarr's Hospital, like the Orthopaedic and Mental Hospitals, is under the jurisdiction of the Ministry of Health, acting through the Cork City and County Health Authority; it also contains an obstetrics block and a separate fever hospital within its grounds.

As was the rule throughout Great Britain and Ireland before World War II, there is no formal control by University College, Cork, of the teaching hospitals as such. Medical students were admitted by grace rather than of right, although the grace was freely extended. In recent years, however, formal agreements between the College and the various hospitals have resulted in all appointments beyond the most junior grades being carried out by joint selection committees representing both the College and the hospital administrations concerned in equal ratio. More recently, the Ministry of Health has made it a condition of appointment to the hospitals under its jurisdiction in Cork that clinicians appointed to them must be prepared to teach. The latest post of this kind is the newly founded professorial Medical Unit designed to provide half the income of the newly founded full-time Chair of Medicine, the other half being provided by University College. The holder of this post is debarred

from private practice, although he is available for consultation by his colleagues within and without the hospital. The appointment to this Unit was made by a commission representing both the Ministry of Health and the College in equal ratio.

At present the remainder of the clinical teaching is done by part-time professors, lecturers, and other recognised teachers of the college. There are six clinical professors, including public health and pathology; and fifteen clinical lecturers, including pathology and pharmacology.

All the professors and lecturers in the preclinical subjects are full-time. There are professors of anatomy, biochemistry, and physiology, with corresponding lectureships. Each of these departments, of course, carries its complement of junior staff, some of whom have hospital appointments which maintain a liaison between the clinical and preclinical aspects of the students' studies. About 30 teachers are duly appointed by the University or College to posts in the preclinical and clinical departments of the Medical School. About a further 30 are recognised teachers on the clinical staffs of the teaching hospitals.

The sequence of subjects in the curriculum is similar to that in other Irish schools. Histology is taught in the department of anatomy, and pathology and bacteriology form a joint department. Instruction in pharmacology, which commences immediately after the courses in anatomy, physiology and biochemistry have been completed, is in charge of the professor of physiology.

The intake of 36 students per year means that each of the three general teaching hospitals receives twelve new students a year. No student, however, attends the same general hospital throughout his clinical course, but "goes the rounds" in accordance with a definite programme.

Higher degrees.—The higher degrees open to graduates who have taken the undergraduate courses at University College, Cork, are the degrees of Doctor of Medicine (M.D.), Master of Surgery (M.Ch), and Master of Obstetrics (M.A.O.), all of the National University of Ireland. The College also awards a Diploma in Obstetrics to candidates who have taken a course prescribed by the Faculty of Medicine and passed the prescribed examination.

THE MEDICAL SCHOOL OF UNIVERSITY COLLEGE, GALWAY

Historical.—As in the case of Cork, the School of Medicine in Galway was founded when Queen's College, Galway, was opened for students in October, 1849, the Faculty of Medicine being one of the original faculties established. The school has always been small, but it has played an important part in the district of Ireland which it serves and its graduates have included a number who subsequently achieved distinction. Among these may be mentioned Peter Freyer, subsequently knighted, who described the classical operation of suprapubic prostatectomy. John Cleland was elected to the Fellowship of the Royal Society while he was still professor of anatomy and physiology at Galway; he went to the chair of anatomy in Glasgow in 1877. Anatomy and physiology were not separated in Galway till 1922.

The Galway Medical School continued without interruption when Queen's College became a constituent college of the National University of Ireland in 1908.

The College and Medical School.—University College, Galway, has about 1,000 students. Instruction is provided in the Faculties of Arts, Celtic Studies, Science, including Agricultural Science, Law, Medicine, Engineering and Commerce.

The main buildings stand on a site of about 10 acres near the centre of the city, the population of which is about 21,000. The Department of Chemistry is accommodated in separate premises less than one-quarter of a mile from the main block, as is also the Students' Union, which contains the principal reading and recreation rooms for students of the College and the headquarters of the College Boat Club. The clinical departments of the Faculty of Medicine and the Departments of Pathology and Bacteriology are situated in the Regional Hospital. Otherwise, all the laboratories, lecture rooms and libraries of the College are on the College premises. The Department of Anatomy was reconstructed about 10 years ago, and a new Science block is in process of erection. The playing fields are situated about 1 mile away.

In University College, Galway, special attention is paid to the Irish language. Certain courses are given through this medium, and scholarships are available for students who are fluent speakers of Irish, whose homes are situated in an area where Irish is the language of ordinary use, and who have received their primary and secondary education through the medium of Irish. It is the aim of the College ultimately to use the Irish language generally in its official and academic life. At present none of the courses in the Medical Faculty are given exclusively through the medium of Irish.

The number of medical students admitted to the classes in anatomy and physiology each year is about 30. The staff includes about 25 members duly appointed by the College or university and a further ten clinicians in the teaching hospitals who are recognised teachers. Instruction in pathology and bacteriology and in the clinical subjects is given almost entirely at the teaching hospitals, whereas the departments of the preclinical subjects are on the College premises.

The principal changes which have occurred in the medical school in recent years have been due in large measure to the building of new hospitals in Galway which have replaced the older and much smaller hospitals.

The new Galway Regional Hospital, which is situated beside University College, has 650 beds. Of these, 450 are "acute" medical and surgical beds. It has separate buildings for obstetrics and gynecology, and for pediatrics.

The Western Health Institution's Hospital at Merlin Park, more usually spoken of as the Merlin Park Hospital, is situated about 2 miles away from the College, but is readily accessible by bus. It has 750 beds and contains special thoracic and orthopedic units. These serve the Province of Connaught as well as County Galway. Part of this hospital is devoted to geriatrics.

The relationship between the Galway Regional Hospital and the Medical School is close, and the Regional Hospital is the principal teaching hospital of the School. The closeness of the bond is shown by Section 62 of the Health Act, 1948, whereby the College is entitled to representatives on the selection board for the selection of senior hospital staff members who will be entitled to act, if appointed, as professors or teachers in the School, and the Minister for Health is empowered to make special provision for teaching and research requirements in the hospital.

As a result of these hospital developments the whole three-year course of clinical instruction is now taken by the students in Galway, and postgraduate training in medicine, surgery, obstetrics and gynecology, pediatrics and psychiatry is available.

The Mental Hospital is situated in

Ballinasloe, some 40 miles distant, but a weekly psychiatric clinic is held in the Galway Clinic, which is beside the Regional Hospital.

Most of the time spent by the students in clinical work and studies is spent in the Regional Hospital, where they attend classes and clinical lectures, ward rounds, and act as members of clinical teams. Most of the clinical clerkships in surgery, medicine, and pediatrics are done in the Regional Hospital, but students also attend the Western Institution Hospital in Merlin Park for clinical instruction in diseases of the chest and orthopedics, and spend part of the period devoted to surgical dresserships there.

Psychiatry is taught partly by formal lectures, partly at the clinics in the Galway Clinic beside the Regional Hospital, and partly in the Mental Hospital Ballinasloe, where the students spend about 1 week continuously in the fourth medical year. Lectures and clinical instruction in obstetrics and gynecology are given in the Regional Hospital. Students in groups of four are able to spend 2 months in residence in the obstetrical block of the hospital. It is hoped to have accommodation for student residence in medicine and surgery soon.

Higher degrees.—The higher degrees of Doctor in Medicine (M.D.), Master in Surgery (M.Ch.) and Master in Obstetrics (M.A.O.) of the National University of Ireland are open to graduates from University College, Galway.

THE MEDICAL SCHOOL OF TRINITY COLLEGE, DUBLIN

History and general features of Trinity College.—A university was founded in Dublin in 1320. It was associated with the two cathedrals. Christ's Church and St. Patrick's but it came to an end with the disestablishment of the cathedrals by Henry VIII. Attempts to reestablish it during the next 50 years had no effect.

Trinity College was founded in 1591 by Queen Elizabeth I of England. The original intention seems to have been that other colleges would be added and that a university of which these would be constituent units would be established. But no other college was founded, though attempts were made to do this during the 19th century, and it was not till 1858 that the Senate of the University of Dublin was formally incorporated. This peculiar sequence of events makes the relation between the College and the University difficult to understand, for the College, which might be assumed to be the lesser partner, is in fact the older, the better endowed and the more firmly rooted in tradition of the two. At the two extremes of their responsibilities the functions of the two bodies can be easily distinguished, the College being particularly concerned with the residential amenities and the University with the conferring of degrees. However, for purposes of ordinary day-to-day working, there are many areas in which functions overlap, and certain Fellows hold offices both in the College and in the University.

At its foundation the College was given a plot of about 50 acres of ground about half-a-mile to the east of the then City of Dublin. The growth of the city, particularly during the 18th and 19th centuries, was largely eastward, so that the College now stands in the centre of the area designated as Dublin.

The total number of students attending is about 2,500. There is accommodation for about 400 men students in study-bedrooms and in single, double, and treble sets of rooms. Residence is not compulsory, but when allowance is made for students who live with parents or relatives in Dublin it is found that

the majority of the men who wish to live in College for two years can do so. Chapel, dining hall, library, meeting rooms for societies and playing fields, as well as lecture and examination halls, museums, laboratories and workshops, are all included on the site, which is roughly a rectangle, with its long axis running east and west. The older residential buildings, with lecture rooms for students in Arts, Divinity, Law, Engineering, Commerce, and Public Administration, the chapel, public theatre, and library are grouped at the west end of the site, and the newer science and medical buildings are situated at the east end, across the College Park with its playing fields. Women students have a hostel with playing fields about 2 miles to the south of the College, and the increase in student numbers has made it necessary recently to acquire ground in the suburbs for additional playing fields for men students.

A few years ago the College acquired a farm of about 800 acres about 30 miles away. This farm provides research facilities in agriculture and opportunities for field work for honor students in this subject.

History of the Medical School.—It appears that medicine was one of the College's early interests. During the first quarter of the 17th century the statutes laid down regulations for medical degrees and for a medical fellowship. A Regius Chair of Physic was founded in 1637, but it was not till 1710 that the College resolved to construct the first building, an anatomy laboratory and theatre. About 100 years later the increasing number of students made it necessary to replace this by a larger building, and toward the middle of last century the buildings which at present house the science and medical departments were commenced. They have been added to and modified constantly since then, and the process continues. The Moyne Institute of Preventive Medicine, housing the Departments of Bacteriology and Social Medicine, was completed in 1953. An extension to the Chemistry Department was opened in 1958, a similar enlargement of the Physics Laboratory is now under construction, and a research block for Biochemistry will shortly be commenced.

The teaching of medicine in the academic surroundings of Trinity College and the granting of the M.D. degree soon involved the College in discussions with the College of Physicians, which, by its first charter, granted in 1667, had been given authority to supervise the practice of physic in Dublin. The first president of the College of Physicians, John Stearne, had received his M.D. from Trinity College in 1658. Relations between the two bodies were, in general, cordial, though there were a number of periods during which cooperation lapsed. One of the longest of these lapses occurred over the will of Sir Patrick Dun, a physician from Aberdeen who, having established himself in a successful practice in Dublin and become President of the Royal College of Physicians, exerted his considerable influence to encourage the development of clinical teaching in Dublin. When he died, in 1713, he directed that, on the death of his widow, a professorship of Physic should be established out of his estate by the College of Physicians. This was done, the College of Physicians and Trinity College being joined in making the appointment of the "King's Professor of Physick," and the duties of the professor being to give lectures in Trinity College. The first appointment was made in 1717. Subsequently, an increase in the income from Sir Patrick Dun's estate allowed the number of these professorships to be increased to four, namely: Institutes of Medicine, Practice

of Medicine, Materia Medica and Pharmacy, and Midwifery.

During the latter half of the eighteenth century it was found very difficult to provide facilities which would enable the King's professors and the other members of the staff of the School of Physic to give clinical instruction to their students. After many unsuccessful attempts to do this had been made, the School of Physic Act, 1800, ruled that part of Dun's estate should be used to build a hospital in which clinical instruction would be given and that the proceeds of the remainder should provide for the maintenance of the patients in the hospital and the payment of £100 per annum to each of the four King's professors. The duties of these professors were to give clinical lectures in the new hospital.

The hospital, called Sir Patrick Dun's Hospital, was opened in 1809, and since that date it has remained the teaching hospital with the most direct connection with the School of Physic of Trinity College. It is situated about ½ mile from the College.

The Medical School at present.—The Medical School departments which have their premises in Trinity College are anatomy, physiology, biochemistry, pharmacology, pathology, bacteriology, and social medicine. All of these have full-time staffs, and in all except Pharmacology the head is a professor. The Department of Pharmacology is in charge of a lecturer. On the clinical side, with their headquarters in the hospitals, are the Departments of Materia Medica and therapeutics, pediatrics, midwifery and gynecology, medicine and surgery. Each of these is in charge of a professor, but only in the cases of medicine and surgery is the professor full-time. In addition to the above departments there are a number of subjects covered in blocks of lectures by teachers appointed for this purpose to the Medical School staff. These include Medical Jurisprudence, Psychiatry, Anaesthetics, Orthopedics, Urology, Otorhinolaryngology, Ophthalmology, Radiology.

The number of teachers formally appointed by the College is 75, to which should be added some 25 "recognised teachers" who are consultants in the hospitals normally attended by Trinity College students. Whereas the Royal College of Physicians continues to elect the four King's professors, according to the terms of the School of Physic Act, 1800, Trinity College has, during recent years, founded corresponding chairs on the establishment of the Medical School, and three of the occupants of the King's chairs are thus professors in the College. The fourth, the King's Professor of Midwifery, is the Professor of Midwifery at the Royal College of Surgeons School. In addition to the professors of Medicine and Surgery, each of these departments has a Regius Professor, who is regarded as the titular head of the department, though he may not be charged with its administration.

Trinity College admits about 55 students to the first-year class in the Medical School each year. The premedical class is much larger, but it includes predental and preveterinary students also. Normally, a very high proportion of those accepted qualify as doctors, probably about 50 per year. About 60 per cent of the students in the Medical School are Irish and about 35 per cent British. The remaining 15 per cent come from countries other than Great Britain and Ireland, mostly Southeast Asia, West Africa, and the West Indies. The class occasionally includes a few Americans.

The arrangement of the curriculum follows the general pattern already described. Histology is taught mainly in the Department of Physiology, though some aspects, particularly those related

to neurology, are taught in the Department of Anatomy. The course of lectures and practical work in Experimental Pharmacology is the responsibility of the lecturer in Pharmacology. It occupies the third term of the Second Year, when the students have finished anatomy and physiology and are commencing their formal attendance at hospital. The course is extended, and clinical aspects are covered by the Professor of Materia Medica and Therapeutics, who is also a consultant physician at Sir Patrick Dun's Hospital. The head of the Department of Bacteriology is the Professor of Bacteriology and Preventive Medicine, and the course in Bacteriology therefore includes the epidemiology of infectious diseases. The courses in pathology and bacteriology extend over the third and fourth years, the latter year being mainly concerned with the clinical applications of both subjects. The course in social medicine is taken partly during the fourth and partly during the final year. In addition to lectures and discussions, visits are paid to institutions and centres of interest, classes are taken in hospitals on suitable cases, and reports are made by students on homes in which they have delivered patients during the course in practical midwifery. The lectures in medical jurisprudence are given in the final year.

Psychiatry is studied principally during the fourth medical year, partly in courses of lectures, partly by attendance at the Mental Hospital, and partly in the psychiatric out-patient sessions of general hospitals.

About twenty students each year go to Sir Patrick Dun's Hospital, and this hospital is not usually attended by students from any other medical school. About ten students go to each of the Royal City of Dublin, the Meath, and the Adelaide Hospitals, each of which is also attended by about ten students from the Royal College of Surgeons Medical School. The clinical staff of each of these hospitals includes members of the Department of Medicine and Surgery of the Trinity College Medical School. The Department of Pediatrics is at the National Children's Hospital (about 100 beds) and of Midwifery at the Rotunda Hospital (120 beds and about 5,000 deliveries each year).

Course in arts for medical students.—No student of Trinity College can have any other degree conferred upon him until he has first received the degree of Bachelor of Arts. The course for the B.A. degree occupies 4 years, and medical students take it simultaneously with the courses of the premedical and first 3 medical years. In order to enable them to do this without interfering unduly with their professional training or reducing the requirement to a more formality, the student is asked to select one or two subjects from a fairly wide range and to attend lectures and take examinations in the subject or subjects of his choice. He is also required to write essays in English which are corrected and returned to him. During the last 2 years of study the choice of the subjects includes a number which are relevant to medicine, though they do not form part of the curriculum—e.g., history of medicine, public administration, social and political institutions. The student is expected to reach a reasonable standard in the exercises for each of the 4 years, and he must pass the B.A. degree examination. Arts and Medical years must proceed concurrently at all stages.

Higher degrees.—The higher medical qualifications offered by Dublin University are Doctor in Medicine (M.D.), Master in Surgery (M.Ch.), Master in Obstetrics (M.A.O.), Diploma in Psychological Medicine (D.P.M.), and Diploma in Gynecology and Obstetrics (D.G.O.).

The only one in which special instruction is provided is the last. Candidates do a course of clinical work at one of the Dublin maternity hospitals and a course in gynecological anatomy and pathology in Trinity College. The first three qualifications are open only to those whose primary degree was obtained in Trinity College.

THE ROYAL COLLEGE OF SURGEONS IN IRELAND

Historical.—The distinction between the work of a physician and a surgeon was emphasised by Hippocrates, but more than 2,000 years were to pass before it was accepted that the training of the surgeon should be as broad and liberal as that of the physician. Barber-surgeons flourished from very early times, and there are records of their guilds and societies in Dublin during the 15th, 16th, and 17th centuries. Following the authority given to the College of Physicians in 1667 to grant licences to practice medicine, the Corporation of Barber-Surgeons attempted to acquire similar power, but, although they were granted a number of charters, their position never became as strong as that of the College. The association between the barbers and surgeons gradually broke down as the demand for a formal training for the practice of surgery became more insistent till, on the petition of a group of surgeons in 1784, the Royal College of Surgeons in Ireland was incorporated under a charter granted by George III.

The new body had, from the first, the double responsibility of controlling the practice of surgery and of educating those who wished to become surgeons. Although professors were appointed in Anatomy and Physiology, Surgery and Midwifery soon after the foundation of the College, lack of accommodation made teaching virtually impossible. After about 5 years premises were acquired, and courses of instruction became available in Anatomy and Physiology, Surgery, Midwifery, Surgical Pharmacy, Botany, and Chemistry. Judged by those current at the time the standards in the Schools of Surgery of the Royal College of Surgeons in Ireland appear to have been high, and it is interesting to note that amongst the early professors were Abraham Colles, in Anatomy and Surgery, and John Cheyne, in the Practice of Physic.

The College moved to its present site in St. Stephen's Green, close to the centre of the city, in 1805 and since then its buildings have been frequently extended and improved. Changes also took place in the requirements for the licence and membership (later to become the fellowship) of the College. A formal system of examinations was instituted, and, in 1885, women became eligible both for the licence and for the fellowship. The requirements of the Medical Act of 1886 made it necessary for the College to become associated with some body competent to grant degrees or diplomas in medicine and an agreement was accordingly made with the College of Physicians, which is still in force. It set up the Conjoined Board, consisting of three members appointed by each College, and made it responsible for all the professional examinations in the course.

The Schools of Surgery.—The present compactly arranged buildings of the College accommodate the meeting and ceremonial rooms of the Council and Fellows, offices, library, students' reading and recreation rooms, as well as the lecture rooms and laboratories of the several departments of the Schools of Surgery. The playing fields are situated in the suburbs, about 3 miles from the College. The departments housed in the College premises are chemistry and physics,

biology, anatomy, physiology, pharmacology and pathology, each of which is in charge of a professor. The professors of Medicine, Surgery, Midwifery, and Pediatrics give their instruction partly in hospital and partly as courses of lectures in the College. Courses of lectures are also given in psychiatry, medical jurisprudence, and hygiene by the lecturers in these subjects. Plans are being discussed to extend the basic science departments, particularly the Department of Pharmacology.

The staff consists of about 35 teachers formally appointed by the College and about a further 80 "recognised teachers" who are consultants in the hospitals attended by students of the College. Under the Conjoined Board Scheme the professors of pharmacology, midwifery and medicine are nominated by the Royal College of Physicians, as are all the extern examiners in the professional examinations, except that in Surgery. About 85 students are admitted each year, a high percentage of whom are from overseas countries.

The general lines of the curriculum at the medical school of the Royal College of Surgeons are similar to those already outlined. Both biochemistry and histology are taught in the Department of Physiology, and the teaching of bacteriology is included with that in pathology. Students receive instruction in psychiatry partly in courses of lectures given in the College, and partly through attendance at a mental hospital and at the psychiatric sessions of a general hospital.

The general hospitals attended by students of the Royal College of Surgeons are St. Laurence's Hospital, Jervis Street Hospital, Mercer's Hospital, the Meath Hospital, the Adelaide Hospital, and the Royal City of Dublin Hospital. The first three hospitals take about 60 per cent of the class each year, the number going to each hospital being based on bed complement. In the last three hospitals, which are attended also by students from the Trinity College Medical School, ten students are admitted each year from the Royal College School.

A number of members of the staff of St. Laurence's Hospital are also members of the teaching staff of the Medical School and the lecturer in Applied Physiology has charge of beds in the Meath Hospital.

Higher degrees.—The Royal College of Surgeons offers the following higher medical degrees and diplomas: The Fellowship of the College (F.R.C.S.I.) and the Fellowship of the Faculty of Anesthesia of the College (F.F.A.R.C.S.I.). Jointly with the Royal College of Physicians it also offers the Diploma in Psychological Medicine (D.P.M.), the Diploma in Ophthalmological Medicine and Surgery (D.O.M.S.), the Diploma in Anaesthetics (D.A.) and the Diploma in Child Health (D.C.H.). Courses of instruction in the basic sciences are provided for the Primary Examination for the Fellowship of the College but not for any of the other qualifications. None of these qualifications is confined to licentiates of the College.

The Fellowship of the Royal College of Physicians of Ireland is, of course, open to those who are licentiates of both Royal Colleges, as it is to any other duly registered medical practitioner.

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Student Beliefs Concerning Human Nature: Some International Comparisons

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SUMMARIO

In 1945, Rayla publicava un obra tractante de credentias re natura human sustenite per studiantes qui assisteva a universitate in un stato del sud-est del Statos Unite. Inquestas similar se sequeva in Grande Britannia, e Warburton, ab le Universitate de Manchester, publicava in 1956 le resultatos de un questionario submittite a studiantes anglese in education, como anque comparationes con le trovatas American (7). Le studio actual extende le inquesta, e comparationes al studiantes in Nove Zelanda, empleante le adaptation de Rayla per Warburton, con standardes plus rigorosemente statistic. Le tres gruppos de studiantes testate esseva (1) 122 studiantes de artes liberal del prime stadio (qui assisteva a un curso de disveloppamento infantile); (2) 111 studiantes medical del secunde anno; e (3) 54 subgraduatos in le quinte anno, omnes ab le Universitate de Otago. Le inventario consisteva de 53 partitas del 180 assertiones original empleate per Rayla. Le clavo original de "Creder—Non-creder" esseva empleate in despecto del insecuritate de alicunes del replicas acceptate. Le resultatos revelava un variation marcate inter le gruppos de Nove Zelanda e America, e de Nove Zelande e Grande Britannia, ma le gruppos de Nove Zelanda, comparate separatemente, monstrava concordantia considerabile quamquam le studiantes del quinte anno dava resultatos melior que les del secunde anno, con le studiantes de education in le medio. Studiantes American, on trovava, pareva plus propense que le alteres de attribuer potentias determinante forte al factores hereditari e constitutional (e.g., superioritate del caucasoides; "voodooismo" in le sanguine del Negro; le major parte del infantes nate mal, etc.). Etiam si le studiantes de Nove Zelanda dava resultatos considerabilemente melior que lor contrapartes American e Anglese, il saltava al oculos ab le resultatos presentate que multe studiantes in omne exemplos national adhere a credentias re natura human contrari a theoria psychologic acceptate. On non trovava que le credentias appellate communmente "superstitiose" esseva acceptate prestemente (ben que circa un quinta del studiantes American credeva a astrologia e a chiromantia). Le characteristica le plus disturbante in omne inquestas, nonobstante, se videva non tanto in le acceptation real de alicun assertiones individual, ma in le attitudines subjacente implicite in le responsas que revelava inter le studiantes subgraduate e graduate un nivello alarmanto de credentias erronee circa homines.

With the education of medical practitioners uppermost in his mind, the Dean of New Zealand's only Medical School is reported as saying a doctor "must be discreet, wise, selfless, tolerant, sincere, have a respect for truth, a reverence for life and personality, and for the dignity of man—in other words, it matters what sort of a person he is" (6). Looking at the preparation of New Zealand medical students, Professor Sayers sees gaps in their liberal education and draws some comparisons in this respect with American students. Pursuant to these considerations the study below may provide some information relating to aspects of this general problem.

INTRODUCTION

In 1956 Rayla (5) published a paper dealing with beliefs about human nature held by students attending a State College in the Southeast of the United States of America. It was suggested that similar inquiries might be made among British students, and some years later

Warburton (7) submitted, from the Department of Education, University of Manchester, the results of the same questionnaire administered to English students studying for their Graduate Certificate of Education. These students were tested before and after their 1-year course, and comparisons were made with the American findings. The test-retest results showed some improvement in the percentage of items correctly answered. Furthermore, although it was recognized that no exact comparison could be made between the two national samples, it was noted that 3 per cent more of the Manchester group marked each item correctly. Both groups of students, however, held a surprising number of inaccurate and superstitious beliefs.

The current study extends the so-called comparisons to New Zealand students in similar fields. With the assistance of a senior medical student[1] (now graduated) Warburton's adaptation of Rayla's inventory was administered to three groups: Stage I arts students and medical students in the second and in their fifth year of their medical course at the University of Otago.

The intention of the study was to make tentative comparisons between the three New Zealand groups, and between these and the English and American groups, by a rather rigorous statistical treatment than in the earlier inquiries.

THE SAMPLES

American.—The subjects numbered 141 of a possible 149 senior premedical psychology students drawn from five successive years of classes in a moderate-sized state college. The unnamed college was of a reportedly representative standard. The curriculum was based strongly on mathematics and chemico-physical science, and almost all the students had completed at least 1 or 2 years in zoology. Few had any previous contact with work in sociology and very few with any branch of psychology.

English.—This group consisted of 143 graduate students who had completed either Arts or Science degrees and were engaged in a 1-year teacher training course which included fifteen lectures and some tutorials in psychology.

New Zealand.—The first medical group comprised 111 of 120 second-year students, the great majority of whom had just completed their Medical Intermediate (a 1-year course in chemistry, physics, and zoology or biology). This group was similar in many ways to the American premedical group, although the students were somewhat younger and had not undertaken liberal studies at the university level.

The other medical student group comprised 54 of 88 undergraduates beginning their 5th year of the medical course. The smaller sampling of the group for testing was due to the unavailability of randomly selected sections undergoing special courses on obstetrics, anesthetics, and public health.

The Arts group consisted of 122 undergraduate students who were attending a course in child development. At the time of testing the students had received some twenty lectures, including a limited treatment of the principles of heredity and some socio-biological material. The class was composed of senior and junior undergraduates, some of whom were engaged in further educational study in teacher training, physical education, or home science.

It is to be noted that these New Zealand groups were tested in the year following the report of the Manchester experiment and some 12 years after the publication of Rayla's article. No infor-

[1] A. L. Batt, M.B., Ch.B., B.A., Dip.Ed., to whom I am indebted for aid in the administration, marking, and interpretation of the medical sample.

mation is available as to when the other studies actually took place or as to the likelihood of changing standards over the years. However, there is some justification for regarding the subjects in each group as reasonably representing similar other groups in their respective countries in spite of the unscientific sampling procedure. The American group has been already described as representative in this broad sense. The Manchester students were all graduates of a good provincial university. The Otago education students are not dissimilar in standard from other New Zealand education students, if the results of external examination assessing at the upper stages can be regarded as indicative; and the high level screening of medical entrants remains fairly constant from year to year. Furthermore, the students in the Medical School, Home Science School, and Physical Education School are drawn from all over New Zealand.

It has long been recognized that, whereas factual information of itself does not markedly affect undesirable attitudes and prejudices, liberal study in areas that relate to these attitudes may lead to fruitful modification. It might be conjectured that, in a similar way, certain incorrect *beliefs* concerning human nature are unlikely to be dispelled merely through contact with related factual data, but that prolonged exposure to such data, together with the opportunity for argument and discussion either in class or out of it, may cause some changes in the desired direction. Hence, one might have predicted that the Manchester students would have shown some improvement over the year of that study, as in fact they did; and, again assuming a basic similarity of intake, one might expect to see a tendency toward improvement in the beliefs of fifth-year medical students at Otago, in comparison with the second-year group.

THE SCALE

(see Table 1)

The inventory consists of 53 items of the original 180 statements used by Rayla. Though Rayla apologized for his scale both on the grounds of doubtful objectivity and formulation, and suggested that, for more systematic research, improvements would be desirable both in the selection of items and in the analysis, because of the intention of making a cross-comparison no such change was undertaken for the present study. However, the findings, including Warburton's internal comparison of the Manchester group, have been subjected to more critical standards of statistical significance in the hope that the rigor of the treatment may offset to some extent the variability due to deficiencies in the sampling. The original key of Believe—Disbelieve was used in spite of comments regarding the doubtfulness of some of the accepted answers.

ANALYSIS OF RESULTS

In the previous inquiries direct comparisons were made between the percentages of subjects incorrect on each item. Rayla compared two sections within his 141 students—40 who ranked highest in college achievement and 40 who ranked lowest. His technique was merely to comment on raw differences in percentage incorrect for each group. Warburton, on the other hand, used a technique of percentage superiority of one group based on the other, and in the investigation of change in belief over the year he defined a clear change of belief as a swing of at least 10 per cent of the students' responses. On this criterion his findings indicate thirteen such changes (twelve of them toward the accepted rating of the belief). The statistical significance of the 10 per cent difference, however, varies with the size

TABLE 1

PERCENTAGE OF STATEMENTS INCORRECT

	1 Key	2 143 Eng′	3 134 Eng″	4 141 USA	5 111 NZm2	6 53 NZm5	7 122 NZe
1. A person who is fatigued invariably does poorer work than the same person fully rested.	D	87	90	92	77	81	97
2. An average child of the cave-man of 10,000 years ago, if brought up in an American home of today, would in all probability become an ordinary American adult.	B	75	78	65	51	66	72
3. Brilliant children are more subject to brain fever than children of average or subnormal intelligence.	D	72	42	49	18	4	22
4. All traits present in a child at birth are inherited traits.	D	70	59	66	50	49	44
5. Apes have been known to solve problems that the average 3-yr.-old child could not solve.	B	64	69	52	32	47	41
6. Primitive people are born with keener senses than the more highly civilized.	D	61	56	51	43	40	45
7. Man is biologically descended from a species of existing apes.	D	57	39	61	15	9	37
8. The conscience is part of man's natural equipment at birth.	D	54	44	36	52	21	39
9. No defect of body or mind can hold us back if we have will-power enough.	D	52	43	32	32	21	34
10. Voodooism is in the blood of the Negro.	D	51	36	32	15	11	11
11. Intelligence plays a larger role in human happiness than does emotion.	D	51	42	55	33	32	36
12. If the tails are cut off of generation after generation of rats, there will eventually be rats born without tails.	D	50	40	42	9	6	20
13. Geniuses are always successful, whatever the handicaps of their environment.	D	47	37	21	20	6	21
14. All traits appearing in a child after birth are the result of environmental influence.	D	46	37	54	33	21	23
15. Most children are born good.	D	45	27	68	54	49	43
16. Human progress is due to increased native intelligence from age to age.	D	43	27	74	36	17	35
17. All people reach physical maturity by the age of eighteen.	D	38	14	10	15	15	11
18. An English-speaking person with German ancestors finds it easier to learn German than an English-speaking person with French ancestors.	D	38	32	34	8	8	13
19. Most great men have been born of poor but honest parents.	D	37	22	43	18	8	9
20. Mothers instinctively know the best ways of caring for their children.	D	35	31	46	46	28	26
21. All of man's actions are determined by his desire to seek pleasure and avoid pain.	D	34	27	52	32	17	25
22. On the average the strongest men physically are the weakest mentally.	D	31	13	18	16	9	7
23. Human nature cannot be changed since it is based upon instincts.	D	30	21	55	38	17	31
24. Men are, on the average, born superior intellectually to women.	D	29	18	37	26	23	11
25. People with long fingers are likely to be artistic.	D	29	22	47	20	9	18
26. Most children are born bad.	D	28	20	19	7	4	2

		1 Key	2 143 Eng'	3 134 Eng"	4 141 USA	5 111 NZm2	6 53 NZm5	7 122 NZe
27.	The average white man is born superior intellectually to the average men of any other race.	D	27	30	65	13	15	10
28.	Red-headed people are likely to be temperamental.	D	23	17	40	26	25	21
29.	Animals depend to a greater extent on inherited ways of doing things than does man.	B	18	28	10	12	21	11
30.	Large-mouthed people are likely to be generous.	D	16	12	28	5	8	2
31.	Any child, if carefully trained from birth, could be made into a successful doctor, lawyer, engineer or journalist.	D	13	12	30	25	9	20
32.	A man's character can be read by noting the size and location of certain developments on his head.	D	15	10	18	13	2	5
33.	Two individuals of the same intelligence will give almost identical testimony concerning an accident which they have both witnessed.	D	12	12	26	15	6	11
34.	With the exception of identical twins, it is extremely unlikely that any two people have exactly the same heredity.	B	15	18	29	5	17	7
35.	Homely women are born with more intelligence than beautiful women.	D	12	10	7	9	2	3
36.	A person who holds his thumbs in his hands is a coward.	D	11	6	7	3	2	2
37.	Faith alone can heal a broken leg.	D	12	10	6	11	2	2
38.	People cannot be sharply differentiated into blondes and brunettes in many cases.	B	10	17	11	13	21	14
39.	Some of the higher apes are as intelligent as the average man.	D	10	6	11	5	2	5
40.	Ancient Greeks were born with better intellects than people are endowed with today.	D	10	8	21	14	4	5
41.	If we knew all about a person's heredity we could predict his success in the world.	D	9	8	22	8	9	30
42.	Brunettes are more trustworthy than blondes.	D	8	7	21	12	2	2
43.	We are more likely to become fatigued from work that does not interest us than from work that does interest us.	B	8	7	3	7	8	3
44.	Green-eyed people are likely to be more jealous than blue-eyed people.	D	7	9	16	4	2	1
45.	Cold hands are a sign of a warm heart.	D	7	4	8	7	2	2
46.	Certain lines on a person's hand are indicative of his future.	D	6	5	20	14	2	16
47.	The position of the stars at the time of man's birth determines, in part, his character.	D	6	4	18	4	0	4
48.	All men are born with equal powers.	D	2	4	9	12	6	15
49.	A person may be a coward in one situation and not in another.	B	2	6	6	6	8	2
50.	Illegible handwriting is a sign of superior intelligence in the educated adult.	D	1	1	7	7	0	1
51.	If your ears burn it is a sign that someone is talking about you.	D	1	1	4	3	0	1
52.	It is unlucky to have anything to do with the number 13.	D	1	0	1	1	2	0
53.	Beginning an undertaking on Friday is sure to bring bad luck.	D	1	0	1	0	0	0

of the percentages involved. The treatment of the data in the present study accordingly followed an analysis of variance technique. The data have been grouped in six ways: the two English groups, i.e., the same group before and after (ENG′ & ENG″ in the tables); the American group (USA); the New Zealand education group (NZe), and the second-year and fifth-year medical groups (NZm2 & NZm5). For each item an estimate of the population replying incorrectly was obtained by grouping the responses for all classes. This estimate was then used to perform a standard error test on the percentages replying incorrectly. The results from each group were then compared with every other group, and significant differences at the .01 level noted. These are presented in Table 2 with certain modifications: (*a*) comparisons between the New Zealand groups and Eng′ are omitted and (*b*) only general comparisons between the New Zealand and the USA and Eng″ groups, respectively, are included.

An examination of the data in Table 2 reveals some interesting findings. In the first place, Column 1, the comparison of the percentages incorrect in the Manchester before-and-after study, reveals eight items with a significant change in favour of the end-of-course results. Warburton, in reporting on the twelve improvements highlighted by his method of noting percentage differences of 10+, referred specifically to only eight of these—those with a difference of 15+—and these are precisely the items identified in Column 1. His four remaining "improvement" items and the one "clear change" in the opposite direction were of lesser orders. It would appear that the technique used in the present inquiry is somewhat more discriminatory. Hence, significant differences obtained in the other comparisons may be looked on as more revealing than if the statistically-cruder "swing of at least 10 per cent" had been used.

It is, therefore, surprising to note the marked variation that obtains between the New Zealand and American, and the New Zealand and English, groups. On the other hand, the New Zealand groups compared separately show considerable agreement—though on the basis of the mean percentage error difference the 5th-year medicals score better than the 2d-years, while the education students lie somewhat in between. The two medical groups both have a substantial percentage of errors on the item "Fatigue invariably affects work adversely," but show up rather better than the education group. Likewise, they are jointly sounder concerning "man's descent from existing ape species" and "prediction of success from heredity." Differentially, the 5th-year medicals are superior to the 2d-years on the items dealing with "the presence of conscience at birth" and "the immutability of human nature." The education students, however, while inferior to the 2d-year medicals concerning "the educability of *Homo sapiens*," surpassed this group regarding "maternal instincts," "male intellectual superiority," "faith healing of fractures," and the "trustworthiness of brunettes." Nevertheless, this virtually represents the extent of the differences, and one may consequently regard these rather as internal variations within a comparatively homogeneous group of New Zealand students.

By working on this assumption it is possible to make cross-comparisons between the New Zealand group taken as a whole, and the American and English groups, respectively. The former comparison is tabulated in Column 3, which highlights each item on which significant variation occurred. As there are, however, some small internal differences

TABLE 2

SIGNIFICANCE OF PERCENTAGE DIFFERENCES BETWEEN GROUPS

ITEM	Column 1. ENG″/ENG′	2. NZm2/NZm5	NZm2/NZe	NZm5/NZe	3. NZme/USA	4. NZme/ENG″	5. ENG′/USA	ENG″/USA
1	..	..	S+	S+	..	..	..	..
2	..	..	S+	..	..	..	..	..
3	S+	..	..	..	S+	S+	S−	..
4	..	..	..	..	..	..	..	..
5	..	..	..	..	..	S+	..	S−
6	..	..	..	..	..	..	..	..
7	S+	..	S+	S+	S+	s+	..	S+
8	..	S−	..	..	..	..	S−	..
9	..	..	..	..	..	..	S−	..
10	S+	..	..	..	S+	S+	S−	..
11	..	..	..	..	S+	..	..	..
12	..	..	..	..	S+	S+	..	..
13	..	..	..	..	..	S+	S−	S−
14	..	..	..	..	S+	..	..	S+
15	S+	..	..	..	..	s−	S+	S+
16	S+	..	..	..	S+	..	S+	S+
17	S+	..	..	..	..	..	S−	..
18	..	..	..	..	S+	S+	..	..
19	S+	..	..	..	S+	..	..	S+
20	..	..	S−	..	..	..	..	S+
21	..	..	..	..	S+	..	S+	S+
22	S+	..	..	..	..	..	S−	..
23	..	S−	..	..	S+	..	S+	S+
24	..	..	S−	..	..	..	..	S+
25	..	..	..	..	S+	..	S+	S+
26	..	..	..	..	S+	S+	..	..
27	..	..	..	..	S+	s+	S+	S+
28	..	..	..	..	s+	..	S+	S+
29	..	..	..	..	..	s+	..	S−
30	..	..	..	..	S+	..	S+	S+
31	..	..	..	..	..	..	S+	S+
32	..	..	..	..	s+	..	..	..
33	..	..	..	..	s+	..	S+	S+
34	..	..	..	..	s+	..	S+	..
35	..	..	..	..	..	..	..	..
36	..	..	..	..	..	..	..	..
37	..	..	S−	..	..	..	..	..
38	..	..	..	..	..	..	..	..
39	..	..	..	..	..	..	..	..
40	..	..	..	..	s+	..	S+	S+
41	..	..	S+	S+	..	..	S+	S+
42	..	..	S−	..	s+	..	S+	S+
43	..	..	..	..	..	..	..	..
44	..	..	..	..	S+	..	S+	..
45	..	..	..	..	..	..	..	..
46	..	..	..	S+	..	..	S+	S+
47	..	..	..	..	S+	..	S+	S+
48	..	..	..	..	..	..	..	..
49	..	..	..	..	..	..	..	..
50	..	..	S−	..	..	..	S+	S+
51	..	..	..	..	..	..	..	..
52	..	..	..	..	..	..	..	..
53	..	..	..	..	..	..	..	..

(*S* represents .01 level; *s* the .05 level; + and − the difference.
E.g., S+ for $\frac{\text{Eng″}}{\text{Eng′}}$ means that the Eng″ group is more correct on this item than the Eng′ group. S− means the reverse.)

in the New Zealand group, no mean has been obtained, and comparisons have been included only when all three of the New Zealand samples (in seventeen items designated by *S*), or at least two of the three (in six items designated by *s*) show significance at the .01 level. All such differences favour the New Zealand group and indicate the marked divergence in belief acceptance between the two national samples. The American students answering the inventory appear more inclined to attribute strong determining powers to hereditary and constitutional factors—e.g., voodooism in the blood of the Negro; happiness through intelligence rather than emotion; immutability of human nature; most children born bad; intellectual superiority of whites; long fingers indicate artist; large mouth indicates generosity; green eyes indicate jealousy.

The transmission of acquired characteristics—as it applies to rat-tails and to language, though having its hereditary features, assigns greater weight to environmental pressures. With a certain measure of group inconsistency these items also find greater acceptance in the American group, as do: the postnatal dominance of environment, the improvement of intelligence from age to age, and a thorough-going hedonism.

The comparison between the English and New Zealand students in Column 4 is a comparison of the New Zealand group as a whole and the Manchester students *after* their course in psychology. The differences consistently favour the New Zealand students save for one item—original virtue—on which two of the New Zealand groups score more poorly, though it is interesting to note that this is an item showing marked "improvement" in the English study. As with the Americans, the English sample showed greater belief in the transmission of acquired characteristics; the descent of man from existing ape species; original sin; voodooism in the blood of the Negro. Other significant differences occurred in the extent to which they denied the level of ape intelligence as ever surpassing that of a 3-year-old child and accepted the inevitability of the genius succeeding. Column 5 re-illustrates Warburton's findings in terms of the present study's technique and demonstrates the greater variability in the direction of the percentage differences. However, the overall pattern agrees with a comparison of the mean item percentage errors and indicates a measure of superiority on the part of the Manchester sample over the American group.

CONCLUSIONS

It is obvious from an examination of the results presented in Table 1 that many students in all three of the national samples adhere to beliefs concerning human nature contrary to accepted psychological theory. Those beliefs more commonly described as superstitious are, in general, less likely to be believed—though certain items gain surprising acceptance (e.g., palmistry and astrology by almost a fifth of American students, and palmistry by somewhat fewer New Zealanders). However, it is the items that receive credence from at least a quarter or even a half of the groups that arouse most concern. The disturbing feature is not so much the actual acceptance of the individual statements but the underlying attitudes which seem to be implicit in the responses. While one must keep in mind that these are relatively small samples, that such an inventory may provoke "acquiescence" in the replies, and that interpretation of the actual items probably varies considerably with different individuals, one may still find cause for anxiety about the state of er-

roneous belief about human beings among graduate and undergraduate university students. If one accepts the qualifications that have to be made about the inventory and the techniques of analysis utilized, there appears in the findings sufficient information to disquiet those concerned with general education, especially in its mental health and humanistic aspects. If we can presume that the beliefs held are representative of attitudes which may circumscribe behaviour especially in interpersonal relations, it becomes important to consider to what extent and in what ways favourable modifications of these student beliefs can be effected, and further to see this problem in its wider setting within the community "zeitgeist."

With a few of the "high-scoring" items, such as No. 1 ("A person who is fatigued invariably does poorer work than the same person fully rested"), a measure of faith might be placed in the presentation to students of experimental evidence (in this case based on differential motivation) as being likely to substantially alter the opinion of many. No. 5 on the problem-solving of apes and, to a lesser extent No. 4 which turns a blind eye to the pre-natal environment, might be dealt with similarly. Further, the relatively low acceptance by the New Zealanders of a higher incidence of brain fever in the brilliant (3) suggests hope for a favourable change here also. Indeed, the changes effected in the Manchester study, though small, might be viewed as encouraging in that many of them would not have been specifically taught for. However, such aspirations must be lowered considerably with respect to items having known or suspected links with deep-seated prejudices.

Since those students who did not believe in evolution would tend to mark Item 7 as Disbelieve, we can assume that among those who accept evolutionary theory there are many who are extremely confused. Would appropriate information assist them to clarify their concept, or is part of their confusion a form of unconscious rejection through the open acceptance of something repugnant to them? From a fifth to at least a third of the samples display supreme faith in will-power (9). What effect might this, and that at least a third to a half believe intelligence is more important to happiness than emotion (11), have on the attitudes and expectations of such teachers and doctors with respect to their pupils and patients, respectively? Do the facts that between a quarter and a half are prepared to accept man's conscience as natural equipment at birth, and that so many appear to believe that children are born good, deceive them as to responsibility toward moral development of the young and make them perhaps as culpable as those (fewer in these findings) whose actions are based on a belief in innate badness?

Racial prejudice would seem related to certain of the beliefs examined in the inventory, though it is difficult to judge the significance of the belief in relation to behaviour. It is recognized that a stated belief, honestly held at a rational level, may give the lie to the related underlying attitude which may under certain circumstances provoke quite contrary behaviour, to the embarrassment and consternation of the individual. Of course, beliefs may represent the deeper prejudices; but, to the extent that there exists limited opportunity for the actual attitudes to be expressed (e.g., colour prejudice in New Zealand), it appears that the current beliefs may be transmitted to the younger generation through identification and introjection almost in spite of the nature and direction of the underlying attitudes.

That the white man is born intellectually superior to other races (27) no doubt has its links with ethnocentrism. In this context it is interesting to note that students in the American group, two-thirds of whom accept this, attend an institution in the Southeast of the States. The English sample is less prone to believe in the white man's superiority, but, still, to a much higher extent than the New Zealanders. Of late it has been publicized (1) that the existence of racial prejudice in New Zealand cannot be denied, though this opinion is not foreign to many New Zealanders who have commented on this themselves. It is perhaps unfortunate in this respect that statements made politically tend to be of the all-or-none variety. "There is complete equality between the two races —racial discrimination does not exist —and we shall continue to take all necessary steps to ensure that it won't exist. I know I am expressing the firm views of New Zealand when I assert as I have always done that there are no inherently superior people" (4). This generalization of the Rt. Hon. W. Nash (then Prime Minister) should rather refer to "*almost* complete equality" and "the firm views of *most* of New Zealand." It must be noted that *latent* prejudice (see Campbell [2] and Hill [3]) may be even more extensive than one is led to believe by the persistent but fortunately limited discriminatory practices that are encountered. Nevertheless, the "zeitgeist" in New Zealand is certainly against racial prejudice. Further support for this contention is found in an analysis of the replies to item 10: that voodooism is in the blood of the negro. It is highly probable that this also fits into the ethnocentric pattern; and again the New Zealand sample, with its recorded high level of disbelief, tends to reflect the societal attitude.

From other points of view the high degree of faith in maternal instincts (20) could raise difficulties in education and medicine, though it might also serve to counterbalance the apparently current belief that parents know practically nothing about bringing up children and should consistently resort to the expert rather than to common sense. Educationally it is disappointing to find so great a section of students who believe human nature cannot be changed (23), especially since the percentages given will not include those who believe in the immutability of human nature but on grounds other than an instinctual basis. The "Log cabin to President" concept (19) seems to be given greater relevance to general success in the States than in England or New Zealand, and the differential scores may give clues to the variations in culture pattern. The significance of the great aristocrats in English history comes to mind, on one hand, and the relatively marked homogeneity of the New Zealand community, on the other.

The preceding commentary does not exhaust the possible interpretations of the data in the tables but rather exemplifies what may be experimented with in the analysis of the findings. It cannot be emphasized too often that the hypotheses suggested rest on somewhat slender evidence; yet certain considerations implied by the results command attention. The reader will no doubt have come to his own conclusions about some of these, but not the least lies in the implications of the findings for the liberal education of medical students. Any such programme prior to or concurrent with medical studies, is likely to set objectives in the attitudinal area. It must be realized that *how* this is undertaken is of more significance than *what* psychological theorizing is invoked.

Finally, one broad generalization may

be drawn from this study. It is that New Zealand students who are so often compared unfavourably with students overseas, in spite of the continued success of exported scholars, show signs of a liberalism in their education—arising from the community and/or schooling—that places them at an advantage over similar groups of students in some other countries. While this merit may not have served to endear them to imported academic dons, it does at least augur well for continued humanistic progress in the fields of education and medicine.

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A Biochemical Training Program for Foreign Medical Scholars

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SUMMARIO

Le Programma pro Maestramento in Biochimia pro Socios al Universitate de Tulane es describite. Establite in 1957, con le adjuta de un concession ab le Fundamento Rockefeller, e organisate principalmente inter le Departimento de Biochimia, iste programma es un curso de studios integrate pro graduatos de universitates estranie qui ha necessitate de reinfortiar lor cognoscentia de chimia e biochimia ante que illes comencia studios avantiate in le plure scientias medical. Admission al programma ha essite limitate, con pauc exceptiones a individuos qui ha *omne* le qualificationes sequente: le D. M. o altere grado graduate in uno del scientias physic o biologic; (2) un cognoscentia elementari de parlar anglese e un cognoscentia avantiate de leger anglese; (3) recommendation per institutiones educational o de recerca; (4) intention del parte del institution patronisante de promover super un base plen-tempore le carriera professional del applicante; e (5) intention de iste persequer un o plus annos de studio additional in alicun centro medical ubi on parla anglese. On reporta le resultatos de complimentos precoce del 49 socios qui ha complite le programma desde 1958.

Tulane University has for the past 4 years offered an integrated course of study for graduates of foreign universities who need to strengthen their knowledge of chemistry and biochemistry before beginning advanced work in the several medical sciences. This program, organized largely within the Department of Biochemistry and called the Biochemistry Training Program for Foreign Fellows, is designed to assist young foreign scholars in adjusting more readily to graduate and postgraduate work in the United States. The Program is pioneering in its attempt within a 12-month period, first, to build a foundation in the basic principles of organic and analytical chemistry and, subsequently, to provide a substantial treatment of biological chemistry. Instruction in the English language and in selected areas of college mathematics is intensively pressed in the early months of the program. Qualified students may, according to individual needs and qualifications, supplement the basic chemical program with one or more of the following elective subjects: mathematics, physics, genetics, human physiology, histochemistry, and advanced biochemical techniques. Students entering with better than average facility in English and mathematics are best prepared to profit by major supplementary courses. The program does not include clinical chemistry, nor does it encourage dilution with other medical sciences except as noted.

Admission to the program thus far has been limited, with only three exceptions, to individuals who have *all* of the following qualifications: (*a*) the M.D. degree, or other professional or graduate degrees in one of the physical or biological sciences; (*b*) an elementary speaking and an advanced reading knowledge of the English language; (*c*) recom-

mendation and sponsorship by educational and/or research institutions; (*d*) intention on the part of the sponsoring institution to promote on a full-time basis the professional career of the applicant; (*e*) intention on the part of the applicant to pursue 1 or more additional years of study in an English-speaking medical center.

Students are registered in the Graduate School of the University and receive graduate credit for appropriate courses. Satisfactory completion of the course of study is recognized by the awarding of a certificate.

Enrollment is limited at this time to sixteen students, and all instruction is in English.

HISTORICAL

The program was established in 1957 with the aid of a grant from The Rockefeller Foundation. It had become evident that too many excellent young foreign medical scholars were encountering serious difficulties in their postgraduate work in the United States. The most common and perhaps most serious deficiency in the prior education of such fellows was, and still is, in the field of biochemistry and its underlying chemical principles. It had become virtually impossible for a visiting fellow, however intelligent and industrious, to derive the maximum benefit from advanced work in any of the medical sciences without a reasonably good and modern foundation in chemistry. Also, the time had long since passed when such a basic handicap could be overcome informally by self-instruction. Thus, an organized remedial course of study became imperative as an intermediate step in the training of such individuals.

Tulane University was a logical institution for establishing such a program. Tulane has for many years had strong ties with many of the countries from which the students would be drawn, e.g., the countries of Latin America and Southeast Asia. Both the Medical School and the Graduate School of Tulane had recognized the importance of and justification for a liberal interpretation of "credits" from foreign high schools and universities. Even before 1957, the Department of Biochemistry at Tulane had considerable experience—and some success—in guiding the rebuilding of the chemical backgrounds of several young physicians from Mexico and Colombia who were being groomed for important teaching positions in biochemistry in their home universities. Thus, beginning in 1951, we had approached the problem by acting as host and advisor to such young men while they took the appropriate "premedical" college courses in English, mathematics, physics, and chemistry. As simple and humane as this sounds, it was not a widely practiced approach to the problems of foreign fellows at that time. More commonly, such students were given research problems and allowed to sink or swim. Unhappily, many sank. Finally, and by no means of least importance, the city of New Orleans is a favorable port of entry and site of adjustment for foreign students in general and Latin American students in particular.

COURSE OF STUDY

In developing a course of study there appeared to be two prime essentials. First, the program must be no longer than 12 months; second, it should, if possible, conclude with full participation of the fellows in the regular course in biochemistry which is given to freshman medical students. This merger was relatively simple, owing to the fact that the Freshman Medical Class at Tulane is divided into two sections for laboratory work in biochemistry. Since the medical biochemistry is given in the spring semester, it was

necessary that the training program begin in early summer. Thus, there were available 7 months in which to prepare the students for biochemistry. The classical sequence of courses, *viz.*, inorganic or general chemistry, qualitative analysis, quantitative analysis, and organic chemistry, was considered inappropriate and probably impractical. It seemed necessary, therefore, to limit the basic chemical preparation to the fundamentals of organic and analytical chemistry, during the course of which the more important and relevant chemical principles would be reviewed and clarified at a general chemistry level. The pioneering teaching experiment of Coles, Clapp, and Epple (1) at Brown University seemed to provide a precedent for such a program, especially since our group would already have had some chemistry. Also, the maturity and expected industry of the students seemed to warrant adoption of a modified Brown University plan. A further departure from tradition concerns analytical chemistry, which is treated almost exclusively as a *quantitative* subject, with emphasis on fundamental principles and techniques rather than on a vast array of *qualitative* minutiae. Finally, the program must include an intensive course in the English language and an *exploratory* course in college mathematics. Both of these are of great importance for most fellows; the English for obvious reasons, the mathematics for practical and other more subtle reasons.

Thus, the program begins with 2 weeks of intensive English to sharpen the ears and tongue for easy communication. During the third week, the students begin the study of analytical chemistry and organic chemistry. The analytical chemistry is composed of lectures and laboratory and is completed in 10 weeks. Initially, the organic chemistry proceeds slowly and is purely didactic, consisting of lectures and conferences. At the conclusion of the analytical chemistry the organic course accelerates and includes laboratory work. Parallel with the analytical chemistry, the student takes a special course in mathematics which is designed to determine the levels of his knowledge and aptitude. The information gained by this type of course facilitates the counseling of students regarding their individual needs for and possible successes in additional mathematics. (See Table 1 for details.)

INFORMATION REGARDING THE FELLOWS

Forty-nine students have taken the full course of study (in four groups) since 1957. Forty-five of these were Doctors of Medicine. Of the remaining four one was a pharmaceutical chemist, one a pharmacist, one a medical technologist, and one a Doctor of Veterinary Medicine. The classes have varied in size from nine to fourteen. Five fellows were women.

The fellows have come from ten countries distributed as follows: Argentina, one; Brazil, thirteen; Chile, seven; Colombia, fourteen; El Salvador, one; Italy, one; Mexico, five; Peru, one; Thailand, one; Turkey, five.

Following is a classification of the fellows by fields of primary interest, i.e., ultimate specialization: anatomy (specifically, histochemistry), three; biochemistry, eleven; medicine, five; microbiology, one; nutrition, two; ophthalmology, one; pathology, two; pediatrics, nine; pharmacology, five; physiology, five; and surgery, five.

Sources of support were: The Rockefeller Foundation, 41; International Cooperation Administration, four; Miles Laboratories, one; National Institutes of Health, one; Tulane University-University of Chile, one; ICETEX (Colombia), one.

At the conclusion of the year's work

TABLE 1

SCHEDULE OF LECTURES, LABORATORIES, AND CONFERENCES (1961-62)

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Summer School (First Period), July 3–14, 1961						
English: English Language and Orientation. Monday–Friday, 8:00–11:00 A.M. and 1:00–4:00 P.M.						
Summer School (Second Period), July 17–September 9, 1961						
A.M.: 8:00 to 9:30	Mathematics	Mathematics	Mathematics	Mathematics	Mathematics	Open
9:30 to 11:00	Organic Chemistry Lecture	Organic Chemistry Lecture	Organic Chemistry Lecture	Organic Chemistry Lecture	Chemistry Conference	Open
11:00 to 12:30	English Language Lecture	Analytical Chemistry Lecture	English Language Lecture	Analytical Chemistry Lecture	English Language Lecture	Open
P.M.:	English Language Laboratory 1:30–5:00	Analytical Chemistry Laboratory 1:30–5:30	English Language Laboratory 1:30–5:00	Analytical Chemistry Laboratory 1:30–5:30	Orientation	Open
Fall Semester, September 18, 1961–January 13, 1962						
A.M.: 8:00 to 9:00	Electives (Mathematics, physics, language), Monday-Saturday					
9:00 to 10:00	Organic Chemistry Lecture	Elective	Organic Chemistry Lecture	Elective	Organic Chemistry Lecture	Open
10:00 to 12:00	English Language Lecture	Organic Chemistry Conference	English Language Lecture	Organic Chemistry Conference	English Language Lecture	Open
P.M.: 1:00 to 5:00	Organic Chemistry Laboratory	English Language Laboratory		English Language Laboratory	Organic Chemistry Laboratory	Open
Spring Semester, January 31–May 26, 1962						
A.M.: 8:00 to 9:00	Electives (Mathematics, physics, language, physiology, histochemistry)					
9:00 to 10:00	Biochemistry Lecture	Biochemistry Lecture	Biochemistry Lecture	Biochemistry Lecture	Biochemistry Lecture	WRITTEN TESTS AS SCHEDULED 9:00 to 12:00
10:00 to 5:00	Biochemistry Laboratory for Section B*	Biochemistry Laboratory for Section A*		Biochemistry Laboratory for Section A*	Biochemistry Laboratory for Section B*	

*The group is equally distributed between the two sections of medical students. Students not in Biochemistry Laboratory may use these periods for Electives.

three fellows returned to their native countries without further work in the United States. The remaining 46 continued their training (or will continue it) at the following universities and medical centers: Tulane University, 21; Yale University, three; Cornell University, Harvard University, University of Tennessee, and Western Reserve University, two each; and one each at Emory University, Jefferson Medical College, Johns Hopkins University, McGill University (Canada), Stanford University, Temple University, Washington University (St. Louis), University of Chicago, University of Illinois, University of Kansas, University of Michigan, University of North Carolina, University of Utah, and the University of Virginia.

According to the information available at this time 21 fellows have already completed their studies in the States and, with only three exceptions, are filling the teaching positions for which they were trained. All the first group (1957–58) has returned. One fellow in this group returned with the Ph.D. degree in biochemistry and another with the M.S. degree in physiology. Both degrees were awarded by Tulane University. Of the nine fellows in the second group (1958–59), all but three have returned to their home countries. Two in this group qualified for Master's degrees, one in nutrition at the Harvard University School of Public Health and the other in histology at Tulane University. Two other fellows made considerable progress toward the Ph.D. degree in biochemistry before they were pressed by their sponsoring universities to resume their teaching duties at home. One of these fellows expects to resume his studies for the doctorate at an early date. Two young pathologists who also were in the second group will shortly begin a fourth year of work at Tulane with the expectation of completing requirements for the Ph.D. degree in biochemistry in 1962. A third member of this class is completing a second year of surgical residency at the University of Virginia.

Information concerning the plans of the fourteen fellows in the (third) class of 1959–60 is incomplete, although I have learned that at least four will spend a third year in training in the States. These four fellows are likely candidates for the M.D. or Ph.D. degrees at the universities in which they are now working.

The 1960–61 class, which at the time of this writing is completing the initial chemical studies and is scattering to all parts of the country, includes several excellent young basic-science fellows who, if time permits, should qualify for advanced graduate degrees.

EVALUATION OF FELLOWS' PERFORMANCE

Performance of the 49 fellows in the Biochemistry Training Program at Tulane has varied from superior by any standards to poor. The only part of our program which provides opportunity for comparison of performance with American students is in the medical biochemistry, in which course at least one-half of the group has shown a normal distribution ranging up with the best. The remaining half tended to concentrate in the borderline category. Actually, only seven of the 49 fellows have failed to make passing grades in the terminal course in biochemistry. Only in two instances was failure attributable to inadequate effort or poor adjustment. Failure of the others was due at least in part to deficiency in English. Some fellows were still handicapped by inadequate English even at the end of the course.

In an effort to obtain some information regarding the performance of our

TABLE 2

EVALUATION OF POSTDOCTORAL FOREIGN FELLOWS WHO BEGAN STUDIES IN THE UNITED STATES WITH THE BIOCHEMISTRY TRAINING PROGRAM

AS TO:	COMPOSITE RATINGS OF TRAINEES BY COMPARISON WITH: AMERICAN-EDUCATED FELLOWS			FOREIGN-EDUCATED FELLOWS		
	Above Average	Average	Below Average	Above Average	Average	Below Average
1. Over-all performance	11	11	7	20	7	3
2. Adjustment to environment	10	14	6	18	11	1
3. Self-confidence	9	14	5	18	8	3
4. Manual dexterity	12	10	3	15	11	1
5. Interest in research	12	11	6	14	12	3
6. Ability in research	7	11	9	13	8	6
7. Ability to communicate	3	12	14	16	11	3
8. Ability to work independently	9	10	9	17	8	4
9. Enthusiasm for work	16	9	4	20	7	3
10. Basic chemical knowledge	6	11	10	13	12	3

"graduates" during subsequent years of specialty work in the States, I have recently distributed a simple questionnaire requesting evaluation of the fellows who have had at least 1 year of work beyond our program. The teachers who had supervised the fellow's specialty work were asked to compare each fellow with others whom they had trained in recent years. Comparison was requested first with American-educated and then with foreign-educated fellows. A summary of the results of 31 replies is given in Table 2. Excluded from the summaries were the two students (a medical technologist and a pharmacist) who were considered experimental participants.

The results of the questionnaire appear to indicate that the over-all performances and the intellectual and psychological capacities of our trainees compare favorably with those of American-educated fellows. Only in the areas of communication and basic chemical knowledge do our graduates suffer to some extent in this comparison. There is a suggestion, however, that better than average enthusiasm, manual dexterity, and *interest* in research compensate for these weaknesses so that the over-all performance of the group exceeds that of the average American-trained fellow. When our trainees are compared with other *foreign* fellows, whose backgrounds vary widely, the figures clearly indicate superiority of our graduates. I have made no attempt to establish the statistical validity of these conclusions, being satisfied for the moment to learn that the combination of a careful selection of students *and* the Biochemistry Training Program is succeeding in preparing medical scholars who appear to be as well trained as the average American-educated medical scholar working at a similar level.

Many of the teachers and investigators who have been responsible for the subsequent specialty training of our "graduates" have kindly expressed verbal and written approval of the Biochemistry Training Program as they envision it and as it appears to have influenced their trainees. I request the reader's indulgence in giving one quotation from a letter written by an outstanding clinician in an eastern medical center: "I enthusiastically endorse your program . . . and am convinced it makes a world of difference as to the amount these foreign doctors can profit by their years of training in this country."

DISCUSSION

The Curriculum.—Limitations of space and time do not permit a detailed des-

cription of the material covered in the course of study at this writing. A more detailed description of the various parts of the program is in preparation for separate publication. However, further general comments on the choice and contents of the several courses and a recounting of some of our experiences seem desirable.

As already emphasized, the core subjects of the program are organic chemistry, analytical chemistry, and biological chemistry. Woven into these subjects are the major general chemical concepts, such as the states of matter, atomic structure, the concept of isotopes, the laws of chemical reaction, the concepts of physical and chemical change, energy transformations, types of chemical reactions, formulas, valence and equations, the kinetic theory, the laws of gases, chemical equivalents, electrolytes and nonelectrolytes, the properties of solutions, and the concepts involved in and derived from "equilibrium." As emphasized by Coles, Clapp, and Epple (1), many of the basic chemical principles can readily be taught as a part of "organic" chemistry; others, as a part of analytical chemistry. Some, of course, are difficult to consider at all except as highly mathematical subjects, i.e., physical chemistry. They also suggested that students who have already had general chemistry deserve a fresh approach when called upon to start anew. Either organic chemistry or quantitative analysis or a combination of the two would appear to provide a fresh start. We have adopted the latter so that organic lectures and analytical laboratory initiate the program. The two supplement each other, organic theory serving as the inspirational and essentially new part and quantitative analysis emphasizing the precision of the subject.

About one-half of the students have supplemented the core subjects with one or more electives without endangering their progress in the chemistry sequence. The most common electives have been mathematics, English, and physiology. Other electives taken by one or more fellows have been physics, genetics, histochemistry, German, French, physical chemistry, and fluid dynamics. Physiology is taken in the School of Medicine, fluid dynamics in the School of Engineering, and all other electives are taken in the College of Arts and Science. Much to the dismay of an occasional fellow, we have not encouraged students to spend their "spare time" in the departments of their future specialization. Early experience indicated that such a diversion of time and interest was unwise. We have taken the position that in our program the fellow has a *unique* and perhaps *final* opportunity to rebuild or strengthen his basic education, which should not be squandered on subjects which will occupy his attention for the remainder of his life.

Among the original secondary objectives of the Biochemistry Training Program was the idea of developing an instructional model for those foreign medical faculties who are confronted with the problem of teaching biochemistry to inadequately prepared high school graduates. We believe that our experience in evolving the Biochemistry Training Program may be of some value in the development of such curricula, and a future communication directed toward this end is in preparation.

It seems probable that programs similar to that at Tulane will be required for many years, and that other American universities may wish to establish them. Somewhat similar programs may also be necessary in the field—that is, in one or more of the countries from which fellows are now being drawn. Looking ahead and recognizing the increasing importance of chemistry in the biological

and health sciences, I envision a demand among graduates of foreign universities for an organized program at a still higher level—perhaps one designed specifically for basic-science students. Such a program might include advanced concepts and techniques of biochemistry as well as a more mathematical treatment of chemical principles. Several students who have come to us with advanced English and a good working knowledge of calculus have been able to take just such a course of study.

The fellows.—The forty-nine fellows who thus far have completed our program have been selected largely by the agencies which supported them. The largest group of fellows was selected and screened by the staff of The Rockefeller Foundation. A group of Colombians was selected independently by Dr. Ernest Carroll Faust, Field Coordinator of the Tulane-Colombia Program in Medical Education (2), which program has for the past 5 years been supported jointly by the Republic of Colombia and the International Cooperation Administration. I was personally responsible for the selection of three of the fellows. Besides the admission requirements listed in the introduction, there is one additional important qualification which the fellow should possess—namely, he should have an awareness of his weakness in chemistry and a strong desire for betterment. Only a very few fellows have shown less than high enthusiasm for the program. Largely, the fellows who have come to us are from among the choice young scholars in their several countries. They are cultured, intelligent, and dedicated young men and women with whom it is a pleasure to work.

Most of the fellows have come to New Orleans with families or have acquired them later—largely by importation from their homes—during the first year. (The one fellow who left his family at home for a year was miserable, and his performance suffered seriously until a reunion in New Orleans was effected.) Besides guiding the fellows intellectually, the director of such a program must give attention to the family and personal problems of each fellow. The problems are frequent and of many sorts, but I am convinced that prompt and sympathetic attention to all of them is an essential part of a successful program. The fellows' problems cannot safely be forwarded to some impersonal office. The Director and his immediate staff and associates are best qualified to give proper aid and advice.

One common and often serious problem which confronts most fellows is their wives' difficulty with the English language. This is all the more serious when there are school-age children in the family. The latter learn English readily, and in consequence tend to isolate the wife and mother. Since this situation was called to our attention by Dr. Robert Briggs Watson of The Rockefeller Foundation, we have attempted to rectify it by setting up a special, separate course in English for wives. The wives of the fellows who are now completing the program have benefited greatly by such a course, and there is much evidence that the performance of the fellows has reflected the benefits.

The staff.—In developing this program we have had the cooperation of a group of deeply interested and understanding teachers. Deserving special thanks and praise for their untiring efforts are the following members of the Department of Biochemistry: Dr. George A. Adrouny, Dr. Dean Day Watt (now at Arizona State University), Dr. Edward L. Rongone, and Mr. Donald C. Roberts—the latter as an English language specialist. Also, Dr. Joseph H. Boyer, an organic chemist and formerly in the Department of Chemistry (now with the

National Institutes of Health), and Mr. Meyer Brill of the Department of Mathematics have played essential and sympathetic roles in the program. Many other members of our faculty and staff have made significant contributions to the program by giving aid with personal as well as with instructional problems. In the early and planning stage of the program, we benefited greatly by conferring on several occasions with Dr. Llewellyn B. Clapp of the Department of Chemistry of Brown University.

SUMMARY

A special course of study for graduates of foreign universities in selected areas of chemistry and biochemistry is described. The program is designed to rebuild and supplement the basic knowledge and understanding of the chemistry of living processes so that its "graduates" can more effectively pursue advanced training in the medical sciences. Results of the early accomplishments of the 49 fellows who have completed the program since 1958 are reported.

ACKNOWLEDGMENT

The development of the Biochemistry Training Program for Foreign Fellows was made possible by a long-term grant from The Rockefeller Foundation. Indeed, the suggestion that such a program was urgently needed came to me first from Dr. John M. Weir, Associate Director of the Division of Medical and Natural Sciences of that Foundation.

During the period of planning and before the Foundation's grant to support the program was assured, two industrial companies made substantial grants to the Department of Biochemistry which greatly expedited our pre-instructional activities. The grantors were Mead Johnson & Company of Evansville, Indiana, and the Miles Laboratories of Elkhart, Indiana. The latter company has continued since 1957 to make an annual grant to the Department in support of the training and research of one or more fellows on a long-term basis.

The program became indebted to the English Language Center of the American University, Washington, D. C., for its cooperation in providing us with a competent English Instructor and in allowing us to use some of its excellent instructional materials. More recently, the English Language Services, Inc., of Washington, D. C., has generously allowed us to use much of its modern teaching materials. Finally, my knowledge of the problems of our trainees and those of the institutions from which they have come was strengthened by two extensive visits in 1958 to five countries of South America. One trip—to Brazil, Argentina, Chile, and Peru—was under the auspices of The Rockefeller Foundation, and the other was to Colombia as a consultant to the Tulane-Colombia Medical Education Program.

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Medical Education in Japan

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SUMMARIO

Education medical ha le plus longe historia in le education plus elevate de Japon: le prime del tres plus vetule universitates a celebrar su centenario esseva le Facultate de Medicina del Universitate Nagasaki, establite in 1857 (le scholas medical de Tokyo e de Keio sequeva in 1858). Il ha nunc 46 scholas medical in Japon (21 institutiones national, 12 public e 13 private). Il ha 3,000 studentes matriculate annualmente; in 1957 le total de studentes medical esseva 12,931. In 1947, le duration de maestramento medical e dental esseva fixate a 6 annos (2 annos de maestramento preparatori, e 4 del curso medical ipse); post su completion, on confere le titulo de "Igaku-shi" (o Doctor de Medicina). Pro obtener le grado le plus elevate de "Igaku-hakushi" (o Doctor de Scientias Medical), le candidato debe normalmente assister a schola graduate durante plus de 4 annos, e submitter un dissertation. Le requirimento de horas de studio, pro le curso medical ipse es approximatemente 1,000 horas per anno (le procentage date al varie subjectos se monstra in le tabula 6) Instruction e in le scientias basic e in le medicina clinic es date per medio de conferentias, exercitation, e obra laboratori e de campo. Un tendentia recente da emphase al travalio laboratori in scientias e inseniamento al lecto del patiente in subjectos clinic. Quamquam le position de commisso clinic es nondum disponibile in le major parte de scholas medical, su avantages ha essite recognoscite, e le scholas de Okayama e de Keio ha yan adoptate le systema. Un personal docente a plentempore es le regula. Conforme a regulationes, cata universitate medical deberea haber su proprie hospital attachate (proportion inter le numero de lectos e celle de studentes medical se monstra in le tabula 7). Quamquam il ha nulle affiliationes official inter hospitales universitari e alteres, municipal o private, a vices excambio de personal ha loco. Le major parte de graduatos medical, post internato, o se matricula in un schola graduate o servi in le hospitales universitari sin paga durante plure annos usque illes son preparate pro practica, empleo hospitalari, o postos docente o de ricera. Scholas usualmente imbracia 5 campos major: Physiologia, Pathologia, Medicina Social, Medicina Internal, e Chirurgia; cata uno se divide in plure major specialitates. Le total numero de medicos e chirurgos practicante in Japon esseva 98,268 in 1957 (89,161 homines e 9,107 feminas); le ration resultante de medico/population esseva 107.9 per 100,000 (classification per empleo se monstra in le tabula 9).

INTRODUCTION

It was not until several years ago that the three oldest universities in Japan celebrated their centenary. The development during the first hundred years might be called rapid when one considers the fact that there are 511 institutions of higher education: 239 universities and 272 junior colleges, as of March, 1959.

The first of the three institutions to celebrate its centenary was the Faculty of Medicine of Nagasaki University, which was 100 years old in November, 1957. The Faculty of Medicine of the University of Tokyo celebrated its centenary in May, 1958, and Keio University marked its 100th birthday in November, 1958.

As can be seen from the fact that two of the three universities celebrated the centenary of the founding of their Faculty of Medicine, medical education has the longest history in the education in Japan.

The study of Western medicine as a formal course was first started at Nagasaki University in November, 1857, when a medical training center was established by a Dutch military doctor. This center later became the Nagasaki Medical Institute. The University of Tokyo Faculty of Medicine was first organized as the Vaccination Office in May, 1858.

The study of medicine was formally established as a university course at a

much later date. The Faculty of Medicine of the University of Tokyo was formally established in April, 1877, simultaneously with the schools of Law, Science, and Literature. Various other medical training centers and medical schools gradually developed into institutions of higher learning.

The dual educational system of university and college was established by the Imperial University Ordinance of March, 1886, and the University Ordinance of December, 1918. The proclamation of the Medical School Regulations in May, 1882, and the College Ordinance in March, 1903, brought about great revisions and improvements in the organization of various schools. A 6-year elementary course, 5-year middle school course, 3-year high school course, and 4-year university course were established. In this system, the college course, which took 4 or 5 years, was different from university course in its more practical approach and did not require the preliminary 3 years of high school. Graduates of middle schools were directly admitted to colleges. Medical education may also be obtained in either university or college course.

Concerning medical training, many supported the argument that medical training should be unified into one university course for the reason that the study of medicine required extensive basic study and a high level of specialized training. This plan was not realized until 1946, owing to lack of funds and other circumstances.

The entire educational system was drastically reorganized in 1947. All existing regulations and laws concerning education were rescinded, and a new education law was announced. The new educational system called for 6 years of elementary school, 3 years of middle school, 3 years of high school, and a university course. Medical and dental courses were fixed at 6 years, while all other university courses were for 4 years. Some of the former high schools were re-established as 5-year junior colleges.

While the education law enforced before 1946 provided for the establishment and management of various types of schools including university, university preparatory course, high school, college, higher normal school, normal school, youths' normal and many others, each having its particular character, schools were reorganized as universities under the new system and junior colleges with the enforcement of the new law.

The university-college system for the medical course was also discontinued. All medical schools were reorganized into university courses. The new medical courses are of 6 years' duration. The first 2 years represent a preparatory training period. Special medical education is given during the last 4 years. Graduates of high schools are qualified to enter the preparatory course.

As of March, 1959, there are 46 medical schools in Japan. Of this number, 21 are national, twelve public, and thirteen private universities. Thirty are faculties of medicine of universities, and sixteen are medical colleges. The standard and requirement are exactly the same between colleges and universities under the new system.

The number of students enrolled each year at these schools differs according to the capacity of the schools. Schools are classified into three, according to the number of enrolled students per year; 40, 60, and 80. In total, 3,000 students are annually enrolled at the 46 schools.

All universities are permitted to establish research laboratories for the study of specific subjects. Private research institutions are also authorized. The Government recognizes all private institutions with secure financial back-

TABLE 1

LIST OF MEDICAL SCHOOLS IN JAPAN

NAME	FACULTY	STUDENTS ENROLLED	TOTAL	YEAR ESTABLISHED
1. National Universities				
Tokyo University	Medical	80	320	1877*
Kyoto University	"	80	480	1899
Tohoku University	"	80	480	1915
Kyushu University	"	80	480	1903
Hokkaido University	"	80	480	1919
Osaka University	"	80	480	1919
Nagoya University	"	80	480	1920
Niigata University	"	80	480	1922
Chiba University	"	80	480	1923
Kanazawa University	"	80	480	1923
Okayama University	"	80	480	1922
Nagasaki University	"	80	480	1923
Kumamoto University	"	80	480	1922
Kyoto Medical Dental College	"	40	240	1949
Hirosaki University	"	60	360	1948
Gunma University	"	60	360	1948
Shinshu University	"	60	360	1948
Tottori University	"	60	360	1948
Tokushima University	"	60	360	1948
Hiroshima University	"	40	240	1947
Kagoshima University	"	40	240	1947
Total:	12	1,460	8,600	
2. Public Universities				
Sapporo Medical University	Medical	60	360	1950
Fukushima Prefectural Medical University	"	40	240	1947
Yokohama Municipal University	"	40	240	1947
Gifu Prefectural Medical University	"	40	160	1947*
Nagoya Municipal University	"	40	240	1947
Kyoto Prefectural University	"	80	480	1921
Mie Prefectural University	"	40	240	1947
Osaka Municipal University	"	40	240	1947
Kobe Medical University	"	80	480	1946
Nara Prefectural Medical University	"	40	240	1947
Wakayama Prefectural Medical University	"	40	240	1947
Yamaguchi Prefectural Medical University	"	40	240	1947
Total:	12	580	3,400	
3. Private Universities				
Iwate Medical University	Medical	60	360	1947
Nihon University	"	80	480	1942
Nihon Medical College	"	80	480	1926
Toho University	"	40	240	1947
Tokyo Medical University	"	60	360	1946
Tokyo Woman's Medical College	"	40	240	1947
Tokyo Jikei Medical College	"	80	480	1921
Keio University	"	80	480	1920
Showa Medical College	"	60	360	1946
Juntendo University	"	40	160	1947*
Osaka Medical College	"	60	240	1946*
Kansai Medical College	"	40	240	1947
Kurume University	"	60	360	1946
Total:	13	780	4,480	
Grand total:	46	2,820	16,480	

* In these schools the premedical course is not under the administration of the medical school but a separate course in the university, hence the number of students is 4 times the number in one class.

ing and adequate facilities as foundations.

ORGANIZATION AND CONSTITUTION OF MEDICAL EDUCATION

Outline of the present state of medical education in Japan is shown in Tables 1–5.

There are two kinds of degrees, viz., Igaku-shi (Doctor of Medicine) and Igaku-hakushi (Doctor of Medical Sciences), the appellation "Igaku-shi" being understood as the medical title.

Those who assume the title of "Igaku-shi" are the graduates of medical universities. To obtain the degree of Igaku-hakushi (Doctor of Medical Sciences) the candidate must be matriculated in the graduate school after the graduation from a medical university, attend the doctoral course for more than 4 years, acquire the required number of credits (50), and submit an acceptable dissertation. The degree of Igaku-hakushi may also be obtained through the presentation of a doctoral dissertation without attending the graduate school.

The requirement of studying hours of the medical course proper is more than approximately 1,000 hours annually, totaling more than approximately 4,000 hours for the period of 4 years (30 weeks annually and 33 hours a week).

The percentage allocated to subject matters and their studying hour is shown in Table 6. All these courses are compulsory for every medical student.

The hour allotted to an elective course is used to further pursue some of the above-enumerated subjects or other appropriate subjects—e.g., medical psychology, history of medicine, physical therapy, anesthetics for all students either as required or elective course.

Usually, the medical course proper adopts a system which divides its 4-year period into 2 parts, viz., the first 2 years for the pursuing of basic medical sciences for all students, and the other 2 years for the study of clinical medicine to those who have completed basic medical sciences and passed the examinations thereof. The hours for basic medical science, clinical medicine, and elective course occupy 44, 48, and 8 per cent, respectively.

TABLE 2

PREVIOUS SCHOOLING REQUIRED OF CANDIDATES FOR THE ADMISSION TO THE SCHOOL OF MEDICINE

Type of school	Period required (years)	Entrance age (years)	Graduation age (years)
Elementary	6	6	12
Lower secondary	3	12	15
Upper secondary	3	15	18
University, faculty of medicine (pre-medical curriculum)	2	18	20

Instruction of each subject of both basic science and clinical medicine is to be given through lecture, exercise, laboratory work, and field work. The percentage of hours allotted to each may vary according to the opinion of the professor in charge. Recent trends in teaching emphasize increase of laboratory hours in basic science and bedside teaching in clinical subjects. Clinical teaching chiefly utilizes out-patients of the university clinic. After each student spends an hour examining a patient, he presents the case to an instructor, who in turn gives a principle and insight of the art of examination as well as the nature of the disease. Besides, seminars are held by an instructor for a group of students (usually five to ten), using hospitalized patients as clinical material. Clinical lectures by a professor take place in a large amphitheater, with all the junior and senior medical students present. Presentation of an important case and detailed discussion of the pathophysiology, diagnosis, and treatment of the disease is given by a professor or

TABLE 3

CURRICULUM FOR THE LOWER SECONDARY

Subject	Grade	1 (hours)	2 (hours)	3 (hours)
	National language	175 (5)	140 (4)	175 (5)
	Social studies	140 (4)	175 (5)	140 (4)
	Mathematics	140 (4)	140 (4)	105 (3)
	Science	140 (4)	140 (4)	140 (4)
	Music	70 (20)	70 (2)	35 (1)
Required	Foreign language	70 (2)	70 (2)	35 (1)
	Health and physical education	105 (3)	105 (3)	105 (3)
	Vocation and homemaking	105 (3)	105 (3)	105 (3)
Elective	Drawing and handicrafts	105 (3)	105 (3)	105 (3)
	Vocation and homemaking	70 (2)	70 (2)	70 (2)
	Others	35 (1)	35 (1)	35 (1)
Moral		35 (1)	35 (1)	35 (1)
Extra-curriculum activities		35 (1)	35 (1)	35 (1)

The above-mentioned school-hours represent minimal requirement according to the article 54 of the Enforcement Regulation of the School Education Law.

One unit hour comprises 50 minutes and the number in the bracket shows the average school-hours per week, assuming that there are 35 school-weeks per year.

To graduate from the lower secondary, the schooling over 1,120 hours annually i.e., over 3,360 hours in 3 years is necessary.

a qualified instructor. Although clinical clerkship is not yet available in most of the medical schools in Japan, its advantage has been recognized, and two medical schools have already adopted the system (University of Okayama Faculty of Medicine and Keio University School of Medicine). The University of Tokyo Faculty of Medicine is also planning to start clinical clerkship for junior and senior students in a year or two.

The proportion of teaching staff to students is set forth in the Standard as follows:

In the case of universities whose fixed number of annual matriculation is 40, the fixed number of total students amounting to 160, the proportion is as follows:

1. Professor—more than 20. The requirement for Professorship is as a rule degree of Doctor of Medicine and Doctor of Medical Sciences, and more than 10 years of research and educational work (one professor per less than eight students).

2. Assistant Professor and/or Lecturer—more than 20. Requirement is similar to that for professor, except the years of experience may be shorter (one assistant professor or lecturer per less than eight students).

3. Assistant—more than 60. Requirement is the degree of Doctor of Medicine (one assistant per less than 2.7 students).

Full-time teaching staff is, as a rule, prohibited to run a hospital or practice medicine in hospitals other than those attached to the universities involved.

In universities whose fixed number of students are 60 or 80, the number of teaching staff is to be increased to the extent necessary and sufficient for research and educational activities.

The total number of medical students is 12,931 as of May, 1957. The classification of full time teaching staff is shown in Table 7.

The number of microscopes to be provided for in classrooms should be equivalent to or more than the number of students in the first and second year—namely, 80 sets of microscopes in a university whose fixed number for ma-

TABLE 4

CURRICULUM FOR THE UPPER SECONDARY

	Subject	Credit	Hour
National language	National language (A)	9—10	315
	National language (B)	2—6	70—210
	Chinese classics	2—6	70—210
Social studies	Society	3—5	105—175
	Japanese history	3—5	105—175
	World history	3—5	105—175
	Human geography	3—5	105—175
Mathematics	Mathematics I	6—9	210—315
	Mathematics II	3	—105
	Mathematics III	3—5	105—175
	Applied mathematics	3—5	105—175
Science	Physics	3—5	105—175
	Chemistry	3—5	105—175
	Biology	3—5	105—175
	Geology	3—5	105—175
Health and physical education	Health	2	— 70
	Physical education	7—9	243—315
Arts	Music	2—4—6	70—140—210
	Fine arts	2—4—6	70—140—210
	Art-craft	2—4—6	70—140—210
	Caligraphy	2—4—6	70—140—210
Foreign language	The first	3—15	105—525
	The second	2—4	70—140

Besides the above-mentioned curriculum, one to the three unit-hours will be prepared for the guidance of the extra-curriculum activities for each student at every grade.

The above-mentioned hours show maximum minimum of the academic year for the 3 years' period.

One unit hour comprises 50 minutes, and one credit is equal to 35 unit-hours which means annual school hours (Subjects and credits concerning vocational curriculum are omitted).

Required subjects for every student; National Language (A), Mathematics I, Physical Education, Health 3 subjects including Society from Social Studies, 2 subjects from Science.

In addition to the above-mentioned subjects, the student of the full-time general course must select and obtain 6 units or more from among Art, Home, Agricultural, Technical, Commercial and Fishery-subjects.

In order to graduate from the upper secondary, student must obtain 85 units of credit or more.

Besides, the students who have graduated from part-time general course, full-time and part-time vocational course and correspondence course as well as full-time general course are qualified to enter the preparatory course of the medical education of the university.

triculation is prescribed as 40. Accordingly, the ratio of microscope and students ranges from 1 to 2.

According to the regulation, each medical university should have its own attached hospital. The proportion between number of beds and number of medical students is as shown in Table 8.

The number of beds in these hospitals attached to 46 medical universities amounts to 35,532 as of 1958, averaging 772 per university.

With regard to field work in dissection, it is regulated that in the first year of medical course proper the number of subjects to be dissected must be more than half of the total number of students in the first year class, viz., in case of

TABLE 5

PREMEDICAL CURRICULUM

Required	Units	
3 subjects from among the subjects of humanity division	12	Philosophy, ethics, history, literature, etc.
3 subjects from among the subjects of social science division	12	Jurisprudence, sociology, politics, economics, etc.
3 subjects out of 4 subjects of natural science division, namely, physics, chemistry, biology and mathematics	12	4 units respectively: (1 unit out of the foregoing 4 units comprises experimentation, barring the case of mathematics)
Either "English, and German" or "English and French" of foreign language division	16	
Health and physical education (lecture and exercise)	4	
Fundamental studies	8	(Student is required to pursue the subjects which is enumerated in natural science division and which he has not yet pursued along with other subjects)

Premedical curriculum is to be pursued by upper secondary graduate when matriculated in a medical university.

Unit number indicates minimum requirement during the 2-year period.

The number of hours required for one (1) unit is 45, consisting of both lecture-attending in classroom and self-studying.

Those who have successfully completed the premedical course are eligible for the matriculation in Faculty of the Medicine of the university.

Each medical university will conduct entrance examination for all applicants, on the result of which it admits the students. The ratio of the admittee to the applicants stands at approximately 10.9 per cent indicating nine contestants to one admittee.

The fixed number of students' admission comprises 1,460 for the national, 580 for the public and 780 for the private, amounting to 2,820.

the fixed number of 40 students, the requirement is more than twenty. Therefore, the number of students participating in dissection will be less than two per subject. In 1958, the total number of the subjects anatomically dissected in 46 medical universities totaled 4,512, comprising 2,287 adults, 23 children, and 1,202 embryos and, during the same period, the subjects pathologically dissected in the 46 medical universities amounted to 6,942.

POSTGRADUATE MEDICAL EDUCATION

Most of the medical university graduates, after the internship, either enroll in postgraduate school or serve in university hospitals without pay to receive clinical and research training until they are ready for private practice, hospital employment, or teaching and research positions after several years.

The total number of physicians and surgeons is 98,268 (89,161 male and 9,107 female) as of the year end of 1957 according to the statistics of Welfare Ministry, resulting the ratio of 107.9 per 100,000 population. Classification by their employment is as shown in Table 9.

To become a medical practitioner, one must pass a national examination conducted by the Welfare Minister in accordance with the Medical Practitioner Law in addition to the degree of Doctor

of Medicine. This examination is held twice annually. The qualification for the examinees is to spend more than 1 year of internship in the fields of medicine and public health either in university hospital, or in dispensary or institute related to public health approved by the Welfare Minister.

The graduate school of medical education usually comprises five major fields, viz., physiology, pathology, social medicine, internal medicine, and surgery, each of which is further divided into several major subjects. The graduate students who are specialized in one of these major subjects and have met the above-mentioned requirements are to be granted the degree of "Doctor of Medical Sciences" (Igaku-hakushi).

Although the number of graduate students annually matriculated in medical universities varies according to the scale of respective graduate school, it usually accepts one or two students per major subjects.

The system of postgraduate medical course is somewhat similar to a combination of graduate school for the degree of Ph.D. and residency program to become clinical specialists. Only a minor part of the graduates from the medical school is admitted to the graduate school. Others enroll the clinical department as assistants to receive similar training and are also eligible for the degree of Doctor of Medical Sciences after the completion of necessary requirement and dissertation.

Although an official qualification of specialized medical practitioner does not exist, a medical practitioner at the inauguration of his practice may assume one or more appellation, in accordance with the Medical Treatment Law from among Internal Medicine Specialist, Psychiatrist, Neurologist, Specialist in Respiratory Organs, Specialist in Digestive Organs (or Gastro-enteric Organs), Specialist in Circulative Organs, Pediatrist, Surgeon, Orthopedic Surgeon, Dermatologist-Urologist (or Dermatologist), Specialist in Venereal Diseases, Specialist in Anal Diseases, Gynecologist-obstetrician (or Gynecologist or Obstetrician), Ophthalmologist, Otorhinolaryngologist, Specialist in Tracheo-Oesophageal Diseases, Physical Therapeutist (or Radiologist), (Dentist for Dental practice) and other appellations approved by Welfare Ministry. The system of specialized medical practitioner is under consideration by the investigation committee established in the Welfare Ministry.

TABLE 6

PROPORTION OF EACH COURSE IN MEDICAL EDUCATION

Course	Per cent
Anatomy	10
Physiology	6
Medical chemistry (biochemistry)	4
Pharmacology	4
Pathology	6
Microbiology (bacteriology)	4
Hygiene	2
Public health	4
Medical zoology (inclusive of parasitology)	2
Forensic medicine	2
Internal medicine (neurology included)	19
Neurology and Psychiatry	2
Pediatrics	3
Surgery	9
Orthopedic surgery	2
Dermatology and urology	3
Ophthalmology	2
Otorhinolaryngology	2
Radiology	2
Gynecology and obstetrics	4
Elective courses hours	8

TABLE 7

RELATIVE NUMBER OF TEACHING STAFF TO STUDENTS

Classification	Number	Number of students per teaching staff
Professor	1,144	11.3
Assistant professor	965	13.4
Lecturer	1,007	12.9
Assistant	4,697	2.8

TABLE 8
NUMBER OF BEDS PER STUDENT

Fixed number at matriculation	Fixed number of total students	Number of beds	Ratio of student to number of beds
40	160	More than 300	0.5
80	320	More than 400	0.6

TABLE 9
EMPLOYMENT OF PHYSICIANS

Founder of hospital or dispensary	46,716
Employee of hospital or dispensary	34,210
Employee of medical education or research institute	12,324
Employee of health administration or hygiene-sanitary service	2,457
Other employment	740
Unemployment	1,821
Total:	98,268

RELATION BETWEEN HOSPITALS AND MEDICAL UNIVERSITIES

Although there is no systemic or official affiliations between university hospitals and other municipal or private hospitals, an exchange of the staff sometimes takes place. For instance, an assistant professor, a lecturer, or an assistant may be transferred to a non-university hospital as part of a staff, or a professor resigning because of the age limit may become a director of another hospital. On the contrary, chances are rather rare for outside practitioners to be invited to a teaching position.

In medical universities, medical treatment is given on behalf of instruction and research for which the professor in charge of a clinical department is responsible, being assisted by an assistant professor, lecturer, and assistants. Furthermore, medical practitioners in the hospitals and institutes designated by Welfare Minister, and related with public health also offer guidances for interns and students.

THE POSITION OF MEDICAL COURSE IN GENERAL HIGHER EDUCATION

The total number of university students enrolled as of May 1, 1957, amounts to 572,461, classified into faculties as shown in Tables 10 and 11.

The total 12,646 students of the medi-

TABLE 10
CLASSIFICATION OF STUDENTS BY UNIVERSITY FACULTIES

Medicine	Proper	12,646
	Pre-medical	5,289
	Subtotal	17,935
Dentistry	Proper	3,272
	Pre-dental	1,569
	Subtotal	4,841
Pharmacy		12,021
General culture		7,487
Liberal arts		10,050
Teacher training		37,445
Education		26,305
Literature		60,269
Literature and education		565
Literary arts		1,128
Theology		375
Buddhism		1,601
Foreign languages		7,388
English literature		270
Humanities		801
Literature and economics		2,486
Literature and politics		492
Sociology		3,586
Social studies		643
Social welfare		556
Laws and literature		2,877
Laws		57,142
Laws and economics		9,508
Laws and commerce		1,602
Politics and economics		19,822
Economics		75,196
Business administration		3,962
Commerce		46,869
Commerce and economics		11,862
Science		11,291
Science and engineering		21,379
Engineering		61,764
Industrial arts		624
Telecommunication		706
Merchant marine		1,410
Mining		641
Agriculture		20,631
Horticulture		495
Veterinary and stock-raising		512
Veterinary		476
Stock-raising		422
Agriculture and veterinary		1,927
Fishery		166
Textile		1,368
Physical education		3,910
Art		2,385
Fine arts		1,770
Industrial arts		431
Music		3,782
Home-making		5,669
Literature and home-making		3,343
Grand total:		572,461

TABLE 11
GENERAL CLASSIFICATION OF STUDENTS IN HIGHER EDUCATION

Area	Per cent
Area of human science	16.2
Area of social science	40.9
Area of natural science	29.5
Area of teacher training	9.8
Others (cultural attainment, home-making, physical education, nursing, etc.)	3.6

cal course proper who are included in the area of natural science, occupy ratios of 2.2 per cent and 7.5 per cent to total students and the students in natural science area, respectively. Beside, there are junior colleges whose schooling ranges from 2 to 3 years. Their number amounts, as of May 1, 1959, to 272, with the accommodation of 75,697 students.

The number of students enrolled in the medical course proper of 4 years is 12,646 or 0.182 per cent of 6,941,000, which is the estimated population as of October 1, 1958, of people aged between 20 and 23.

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Medical Education in Japan and a Reform Attempted in Okayama University Medical School

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SUMMARIO

Le historia de education medical in Japon es brevemente revidite e alicun aspectos del systema actual de maestramento son discutite in detalio. Omne instruction relative al scientias medical ha essite unificate sub le systema universitate desde 1951. Maestramento subgraduate require un curso premedical de duo annos (que coperi scientias natural e social, linguages estranie e maestramento physic) e quatro annos in le schola medical. Super su completion le grado de *Igaki-shi* (le equivalente de Doctor de Medicina) es conferite; licentia de practicar es concedite post un internato de un anno e le examines per le Consilio de Licentia National. Un grado plus elevate, celle de "Doctor de Scientias Medical" es conferite al graduatos post le completion de un curso de quatro annos in le schola postgraduate de medicina (o sex annos in medicina clinic o cinque in medicina basic). On require etiam le presentation de un these doctoral.

Un inspection de statisticas general in institutiones medical provide con le adjuta de plure cartas, dartos re matriculation (Tabula I monstra pro 1960 un total matriculation de 12,488 in scholas medical, 3,446 in institutiones postgraduate); le organisation interne del scholas; e le personal docente. In un discussion detaliate del curriculo medical del Universitate Okayama, le tendentia e objectivos reverberate in le nove systema, in operation desde 1958, son revidite e comparate con le passates. Le facto que le nove systema monstra un grande melioration super le anterior pare amplement substantiate per le resultatos del pauc annos passate. Nonobstante, difficultates existe ancora e pote esser superar solmente per un plus grand budget, un augmento in le personal docente, e le melioration de certe methodos docente (e.g., le major conferentias con prension de notas.)

A BRIEF OUTLINE OF MEDICAL EDUCATION IN JAPAN

The Oriental medicine practiced in Japan from ancient days finally began to be replaced by Occidental medical practices with the coming of Dr. Philipp Franz von Siebold, a Dutch army surgeon (German doctor), in 1823. A little later, in 1857, the Tokugawa Shogunate dispatched a group of twelve court physicians to Nagasaki, where a medical center under the direction of Dr. Pompe van Meerdervort, a Dutch naval surgeon, was established. At this center these doctors received systematic Occidental medical training under the guidance of Dr. Pompe.

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Thereafter, this Medical Center hired European doctors as permanent instructors and taught several courses such as physics, chemistry, anatomy, physiology, pathology, pharmacology, internal medicine, and surgery in the Occidental way. This was the beginning of modern medical education in our country.

In 1861, exactly 100 years ago, a Vaccination Center (forerunner of the Occidental Medical Center) was established in Tokyo, and with an adequate professorial staff a real start in medical education had been made. According to the regulations of the Occidental Medical Center *(Seiyo Igakusho)*, promulgated in 1870, it offered a 7-year course, including a 2-year premedical course and a 5-year medical course. In the premedical course the students were required to

take German and Latin as the foreign language requirements. In the medical school they offered the courses in the following way:

First Year: Descriptive anatomy, organic chemistry, minerology, zoology, physics, physiology, botany, and the principles of surgery.

Second Year: Techniques of surgery, laboratory work in chemistry, the principles of physiology, the principles of applying bandages, pharmacology, orthopedics, pathologic-anatomy, pathology, and the principles of internal medicine.

Third Year: Principles of pathology and internal medicine, the methods of diagnosis, surgical operation, pharmacy, clinical lectures on internal medicine and surgery.

Fourth Year: Lectures on out-patient treatment in ophthalmology, obstetrics, legal medicine, gynecology, internal medicine, and surgery.

Fifth Year: Actual practice in hospitals in the subjects mentioned above, as well as the practice and application of other medical sciences.

The Medical School of Okayama was founded in 1870 by the Lord of Okayama and was called *Igaku-Dojyo* (Medical Center). Dr. R. Bauduin, a Dutch physician, was the leader. In 1880 the name of the center was changed to Okayama Prefectural Medical School. With the necessity to propogate medical education of the European system, both public and private medical schools were established one after another, and by 1887 there were opened five schools in Japan. Our school is one of them and proud of long tradition. As a graduate of our school I can point out Dr. S. Hata, who was sent to Germany after graduation and assisted Dr. Paul Ehrlich in discovering the antisyphilis agent 606 (Ehrlich-Hata). Ever since then the main current of Japanese medicine has followed the German tradition.

SOME ASPECTS OF EXISTING CONDITIONS OF MEDICAL EDUCATION IN JAPAN

In 1946 under the advice of Public Health Works of SCAP the plans for reorganizing medical education were carried out as follows:

1. Since Japanese medical education had been conducted under a dual system of universities and technical colleges, it was decided to change it into a single system of medical schools of the university level, in view of the specific purpose of medical education.

2. An internship was instituted for graduates of medical schools which was to be followed by examination of the National Board of Medical License.

Existing Medical Education System

All instruction relating to the medical sciences has been unified under the university system since 1951, and the existing educational system is generally run as follows:

The course of study.—A minimum of 2 years in the premedical course and 4 years in medical school for a total of 6 years or over is required.

Entrance requirements.—The premedical course: Those who have graduated from senior high school (completing the 12-year course in total) or those who have equivalent education are allowed to take entrance examinations.

The medical school: Those who have completed the premedical course or who have finished 14 years' schooling, and have education more than equivalent to the above, are eligible.

Prescribed courses.—Premedical courses: In total 64 units or more are required, covering such general subjects as cultural, social and natural sciences, foreign languages, and health and physical training.

Medical course: Prescribed courses and related subjects must be taken, and upon

TABLE 1
MEDICAL SCHOOLS IN JAPAN (1960)

	No. schools	Enrollment limit (per year)	Total enrollment	Postgraduate schools	Enrollment in Postgraduate schools
National	21	1,500	6,370 (342)	21	2,438 (73)
Public	12	580	2,482 (164)	8	318 (11)
Private	13	800	3,636 (451)	12	571 (35)
Total	46	2,880	12,488 (957)	41	3,446 (119)

Note: (*a*) The total enrollment is the number of students in medical schools, and the figure in parentheses is the number of women students.
(*b*) The number of postgraduate schools is that of accredited postgraduate schools of medicine established in universities.

the completion of the full course the degree of *Igaki-shi*, equivalent of M. D., is conferred on graduates.

Enrollment.—The number of new students enrolled each year may vary from 40, 60, or 80 according to the size of the school. It is fixed at 80 students for each year at our Medical School.

License to practice medicine.—The license to practice medicine in Japan is conferred on the graduates of medical schools after 1 year internship at some accredited hospital and after passing the examinations of the National Board for the License to practice Medicine.

Doctorate degree.—The degree of Doctor of Medical Science is conferred on the graduates of a university medical school or of a medical university, who have completed a 4-year course in the postgraduate school of medicine or who have studied 6 years in clinical medicine or over 5 years in basic medicine, and after the presentation of a thesis for the doctorate degree and having passed the examinations.

General Statistics of Medical Institutions

The number and enrollment of recognized medical schools and universities are as follows (Table 1).

Teaching staffs.—On the basis of educational and research needs, each medical school has organized departments (divisions) or lectureships, and the teaching staffs of such departments generally comprise, in basic medicine:

A professor, an assistant professor, an instructor, and two assistants — a total of five persons.

Lectureship in clinical medicine.—A lectureship is comprised of one professor, an assistant professor, one or two instructors and three to eight assistants, totaling six to twelve persons.

Curriculum of Medical Education

Examples of the curriculi of medical education that had been formerly offered at our Medical School and at the Faculty of Medicine in Tokyo University are illustrated in Table 2.

The curriculum of Okayama had been instituted in 1922, and the courses were partially modified to suit the establishment of new departments from time to time, and that system continued in effect up to 1955. On the other hand, the curriculum of Tokyo University had been established in 1952, and it is presumed that some modification has been made since then (Table 2).

THE TREND OF MEDICAL EDUCATION IN THE PAST AND THE AIM OF THE NEW SYSTEM IN OUR MEDICAL SCHOOL

It is true that the research work of the teaching staffs themselves, as well as the education of postgraduate students, are an important phase of medical education in Japan. Nevertheless,

since the school is the place of education, the most important thing is the education of undergraduate students. The instruction in Japanese medical schools in the past had been conducted principally with lectures, where students relied mostly on notes taken at major lectures. Naturally, the students tended to receive relatively less practical training and had little chance to discuss the problems of clinical subjects with instructors, receiving only polyclinical training at best. The examinations for the degree of M.D. were conducted in the third trimester of the fourth year for all subjects. Consequently, students hardly had any opportunity to come in contact with inpatients and to get actual practice in examining specimens from these patients. And it can be said that they acquired practical knowledge of medicine only during the internship. The professors responsible for guiding the students in each department were generally too occupied with their own research work and the rounds of clinical wards. Their time and energy had been all but spent before they were able to turn their attention to the guidance of their pupils.

To rectify this situation an attempt was made to install a reorganized system in our School at least in clinical training. I had a chance to travel through European countries (England, Germany, and France) and also through the United States of America by invitation of the China Medical Board, in 1954, and to study their educational systems. Therefore, upon my return I started a thorough reappraisal of our system and embarked upon the reorganization of the entire curriculum from the very foundation in the hope of establishing a plan of instruction that would suit the present needs to the best advantage.

In July, 1955, I formed a Committee for Reconstructing the Curriculum, with Prof. S. Takahara (Director of the University Hospital) as its chairman, who had some experiences in American medical education. After careful study of European and American curriculi and weighing those points that might be adopted to our system, we formulated tentative plans of instruction 14 times, and the Committee met 17 times to discuss these plans, and finally organized a new plan of instruction.

The new system was put into effect in 1958, when Prof. S. Murakami succeeded me as the Dean of Medical School. During the period of orientation from the former to the new system there arose many complex problems, but at present the new plan is operating smoothly, despite the fact that we still have some problems to be solved.

THE OUTLINE OF THE NEW CURRICULUM

Allocation of Hours

Hours of instruction.—Allocation of hours of instruction to each course has been done on the basis of medical school standards as shown in Table 3.

The medical curriculum is divided into basic sciences, clinical medicine, and social medicine, and it is organized so as to emphasize the individual characteristics of each to the best advantage and, at the same time, to correlate them with each other. Basic sciences are allocated intensely to each department up to the second trimester of the second year, and a part of practice in pathology and social medicine are so distributed as to be parallel with clinical medicine.

As for clinical medicine, after completing guidance lectures on the principles of each course, the students are assigned to each of the clinical departments in ten groups of eight students each for a fixed period of time, and they receive bedside lectures and clinical practice. By instituting conference, seminars, preceptor system of a few students, some intensive training can be

TABLE

TOKYO

Faculty of Medicine, Tokyo University (1952)

	I			II			III			IV	
	1	2	3	1	2	3	1	2	3	1	2
Anatomy	100	40					7.5				
Practices	30	150	30								
Physiology	70	70	10								
Practices				30							
Biochemistry	60	30									
Practices	30	10									
Microbiology		30	40	10							
Practices			60	30							
Pathology			60	40	20						
Practices				30	30						
Demonstration									20	20	20
Parasitology	10		20								
Practices											
Pharmacology			30	40	70			15			
Practices				30							
Hygiene		10	10	10	15						
Practices					30						
Public health								10	10	10	10
Practices									20	20	20
Legal medicine				10	20	10					
Practices						20					
Internal medicine				45	65	65	75	70	60	60	60
Practices in diagnosis					30	30					
Practices in out-patient clinic						6	18	18	18	18	18
Physical therapy						21	23	23	4	4	4
Surgery			20	45	69	70	70	60	30	30	30
Practices in out-patient clinic						6	12	12	12	12	12
Orthopedic surgery						15	15	15	10	10	10
Practices in out-patient clinic								6	12	12	12
Obstetrics and gynecology					10	10	10	10	25	25	29
Practices in out-patient clinic									6	6	6
Dermatology						10	15	10	15	10	
Urology								15	15	15	15
Practices in out-patient clinic							6	6	14	14	14
Ophthalmology					40	10	15	15	15		15
Practices in out-patient clinic							6	6	12	12	12
Otorhinolaryngology						10		15	10	15	20
Practices in out-patient clinic								6	12	12	12
Pediatrics						10	10	10	15	15	15
Practices in out-patient clinic								6	12	12	12

RRICULUM

OKAYAMA

Okayama University Medical School (1952)

otal	I			II			III			IV			Total
	1	2	3	1	2	3	1	2	3	1	2	3	
57.5	192 72	28 252	22										556
80	48	112	44 22	72									298
30	48	56	22 44	48									218
70	24	56	44 44	48									216
240			66	24 36	28 126		24	28		24	28		384
30						22	24	42					88
125			44	72	28 56								200
75							24	28	22 11	12	14		111
100				24	28	22			11	12 12	14 14		137
60									22	24	28		74
735			44	96	112 56	88	96 12	112 14	44 16	48 18	56 18		830
490				24	42	99	55 12	105 14	40 16	43 18	49 18		535
117					14	33	24 5	14 6	11 8	12 9	14 9		159
137						22	27 5	31 6	36 8	27 9	31 9		211
174					14	33	36 5	28 6	11 8	12 9	14 9		185
158						22	24 5	14 6	11 8	12 9	14 9		134
112						22	12 5	14 6	11 8	12 9	14 9		122
117						22	24 5	28 6	22 8	24 9	28 9		185

TABLE 2—(*Continue*

	Tokyo Faculty of Medicine, Tokyo University (1952)										
	I			II			III			IV	
	1	2	3	1	2	3	1	2	3	1	2
Neuropsychiatry					15	15	10	15	15	15	
Practices in out-patient clinic							6	6	6	6	6
Radiation medicine					16	15			15		15
Practices in out-patient clinic							6	6	6		
Dentistry									10	10	10
Practices										4	4
Special lectures	90	30	15	60		5	15		7.5	40	17.5
Total:	390	370	295	380	370	328	319.5	355	406.5	407	338.5

given. In addition, as much as possible major lectures for the entire student body that were given in the past, were discarded, and individual lectures, C. P. C., and joint lectures are given. The joint lectures are conducted by more than two professors with the cooperation of professors in basic medicine, and also the lectures themselves have been altered in their context as to suit the purpose of the new system.

The outlines of lectures in each department are formulated, and each subject of the lectures is printed and distributed to students in advance so that the students no longer need to take notes.

Parting from the European system of lecture education, we now place our main emphasis on practical work and on the training of individual students. To this end, in addition to the professor, the entire teaching staff of each department participates in instruction.

For the purpose of intensive training, examinations are conducted for groups of students each time they complete a course.

The plan of instruction illustrated in the table elsewhere is organized on the following basis:

First trimester — from April 8th to July 10th (12 weeks of instruction)

Second trimester—from Sept. 11th to Dec. 24th (13 weeks)

Third trimester—Jan. 8th to March 31st (9 weeks)

Total of 34 weeks of instruction for one year (including examination period).

New Plan of Instruction (See Table 4)

Administrative System of the New Curriculum

The plan, its execution, and management are shown in the following, comprising the Administrative Board of Education and Liaison Committee of Educational Affairs. The Administrative Board meets once a week, and the Liaison Committee of Educational Affairs holds meetings more than once in a trimester.

Regulations of the Administrative Board.—

1. The Board discusses and handles the following problems:

Plan and establishment of the curriculum (courses of instruction)

Management and modification of execution of instruction

Examinations

Plan and execution of auxiliary and special lectures

Other pertinent problems pertaining to the courses of instruction

2. Problems discussed are to be re-

CURRICULUM

OKAYAMA

Okayama University Medical School (1952)

Total	I			II			III			IV			Total
							12	14	22	24	28		
115							5	6	8	9	9		137
						11	12	14	11	12			
79							5	6	8	9	9		97
							12	14	11				
38										3	3		43
280		24	28			33			22		28		135
4019.5		408	532	396	444	504	429	470	562	414	421	485	5065

ported to the Professors' Council and the decision to be reached only with consent of the Council.

3. The Board is composed of the Dean, two professors elected from the departments of basic and social medicine, and two professors elected from clinical departments.

The Director of the University Hospital and professors involved in the problems to be discussed may attend the session of the Board if necessary.

4. The term of the members of the Board shall be 2 years, and half of them change every year.

5. The Dean of the Medical School, acting as its chairman, calls the Board into session and presides over meetings.

6. The assistant secretary of administration records the proceedings of the Board and manages the business affairs of the Board.

Supplement: These regulations are to be effective as of January 1958.

The Liaison Committee of Educational Affairs.—

1. The Committee discusses the problems concerning the plan of instruction and its execution that the Administrative Board deems necessary.

2. The Committee is composed of six members of the Educational Affairs, 26 members (one from each department), and nine student members consisting of two representatives of each class and one representative of the Students' Council.

3. When a problem arises pertaining to the course of instruction in basic, social, or clinical medicine, the Committee may call the Committee of the related department into session and discuss the problem together.

EXECUTION OF THE NEW CURRICULUM

Lectures on Guidance Course

After completion of the courses in basic medicine, beginning with the third

TABLE 3

HOURS OF INSTRUCTION

	Basic medicine	Social medicine	Clinical medicine	Electives	Total
Minimum hrs. by the standard of med. education	1,504 (38%)	237 (6%)	1,980 (50%)	239 (6%)	3,960 (100%)
Hours under our new system	1,614 (36%)	314 (7%)	2,246 (50%)	285 (7%)	4,459 (100%)

TABLE 4

NEW PLAN OF INSTRUCTION, OKAYAMA

YEAR	I			II			III			IV			JOINT INDIVID. LECTURE C.P.C.	TOTAL HOURS
Trimester	1	2	3	1	2	3	1	2	3	1	2	3		
Anatomy	168 *144*	*180*												492
Physiology	24	72	64 *16*	*66*										242
Biochemistry	48	48	*64*											160
Pharmacology			16	88	*66*									170
Pathology				110	*99*			*65*					32	306
Microbiology	24	24 *48*	32 *32*											160
Parasitology		24	16	*44*										84
Hygiene			16	44	*22*									82
Public health						42	24	26	*54*					146
Legal medicine									36	24	26			86
Internal medicine					208	40	(6 wk)		156	(6 wk)		156	64	624
Surgery					78	40	(6 wk)		156	(3 wk)		78	40	392
Ophthalmology						20	(3 wk)		78				8	106
Otorhino-laryngology						20	(3 wk)		78				8	106
Radiology						20	(3 wk)		78				12	110
Dentistry						20	(3 wk)		78				8	106
Neuropsychiatry						20				(3 wk)		78	8	106
Pediatrics						30				(3 wk)		78	16	124
Orthopedic surgery						20				(3 wk)		78	12	110
Dermatology and urology						30				(3 wk)		78	16	124
Obstetrics and gynecology						40				(3 wk)		78	20	138
Electives— Auxil. lecture	24	24	32	33			(6 wk)		156	(6 wk)		156	60	485
Total hours:	432	420	288	385	473	342		985			830		304	4,459

Note: Figures in this table stand for the total hours of instruction for each trimester. Those in italics are hours of practical work, and number of weeks in clinical medicine represents the total training period of one group.

TABLE 5
SETS OF PRINCIPLES OF EACH CLINICAL COURSE

First week	Radiology	10	*Otolaryngology*	20
Second week	*Radiology*	10	Surgery	15
3rd week	*Ophthalmology*	20	Surgery	10
4th week	Pediatrics	15	Surgery	15
5th week	*Pediatrics*	15	Dermatology and Urology	15
6th week	Obstetrics and gynecology	20	*Dermatology* and *Urology*	15
7th week	*Obstetrics* and *gynecology*	20	Dentistry	10
8th week	Internal medicine	20	*Dentistry*	10
9th week	Orthopedic surgery	20	Neuro-psychiatry	10
10th week	Int. medicine	20	*Neuro-psychiatry*	10

Note: Italics signifies the time of examination.

trimester of the second year, lectures are given concentrating on the principals of each clinical course, and these are conducted by professors or by assistant professors. Lectures on each subject are so handled as to avoid duplication, and the outlines of each lecture are distributed in advance to students in order to attain the best results.

With the exception of internal medicine, the principles of one course are handled in the manner illustrated below, and they comprise lectures concentrated within the period of 2 weeks. For concrete examples see Tables 5 and 6.

Clinical Training

After completing these guidance courses of principles, a class of students is divided into ten groups; each group comprising eight students is assigned to a clinical department for a fixed period of time, and these groups are rotated from one department to another where they receive clinical lectures and practical work, including conferences, seminars, and preceptor system in the student guidance room of each department.

Third Year.—Six weeks each of internal medicine and surgery are allocated for each group. Three weeks each of radiology, otolaryngology, ophthalmology, and dentistry for each group, and in addition 6 weeks for an elective course.

Fourth year.—Six weeks are allocated for internal medicine, and 3 weeks each for surgery, pediatrics, neuropsychiatry, orthopedic surgery, obstetrics and gynecology, and dermatology and urology, for each group, and in addition 6 weeks for an elective course.

An example of the training program for one group (figure represents the number of weeks allocated in Table 7).

Teaching plan in each department.—At the beginning of each trimester a professor is required to formulate his plan of guidance in detail for the period when he will have students under his

TABLE 6
ALLOCATION OF HOURS IN THE 5TH WEEK

8:30	10:30	12:30	2:30	4:30
Mon.	A	B	A	
Tues.	B	A	B	B
Wed.	B	A	B	*
Thurs.	A	B	A	B
Fri.	B	A	auxiliary lecture	
Sat.	A	A		

A stands for Pediatrics, *B* for Dermatology and Urology. *A* is for questions and examination in Pediatrics, while the examination in *B* is conducted on Saturday in the 6th week.

TABLE 7

AN EXAMPLE OF THE TRAINING PROGRAM FOR ONE GROUP
(FIGURE REPRESENTS THE NUMBER OF WEEKS ALLOCATED)

	APRIL							JAN.						MARCH
Third year	Internal medicine	Surgery	Radiology	Internal medicine	Elective	Oto-laryngol.	Dentistry				Ophthal-mology	Surgery	Dermat. and urology	Elective
	3	3	3	3	3	3	3				3	3	3	3
Fourth year	Pediatrics	Internal medicine	Neuro-psychiatry	Orthopedic surgery	Surgery	Elective	Internal medicine				Obstetrics and gynecology	Dermat. and urology	Elective	
	3	3	3	3	3	3	3				3	3	3	

care. In this plan he will clearly outline the distribution of instructors who guide the students and the lessons which they give in a student guidance room (this is a small room but enough to take care of a group of eight students in each department). In addition, in each room there are provided enough specific textbooks of each department for the use of one group of students to facilitate their study.

Lectures Conducted for All Students

Five major lectures are given each week to the entire third- and fourth-year student body, who are assigned to different departments in groups as shown elsewhere in the plan of instruction for one week.

Individual lectures.—Each department gives two to six lectures during one academic year.

Joint lectures.—Each department is held responsible for one or more joint lectures in one academic year, and the subject of such a lecture will be a specific one conducted by professors in clinical medicine in cooperation with professors of basic medicine. Besides the student, members of the department are encouraged to attend these lectures, and in future we intend to call members of Okayama Medical Association to attend such joint lectures.

Special lectures.—Some special lectures are conducted from time to time on such subjects as statistics, sampling, human genetics, endocrinology, social insurance, history of medicine, introduction to medicine, legal aspects of medicine, and anesthesiology, etc., as auxiliary lectures.

C. P. C.—Professors of pathology will conduct C. P. C. with participation of clinical professors.

Social Medicine.—Lecture of social medicine is conducted once a week dealing with public health in conjunction

TABLE 8
ONE WEEK'S PROGRAM

	8:30	12:30	2:30	4:30
Mon.			4th year public health	
Tues.		Clinical training by groups	C.P.C. or auxil. lecture	
Wed.		3rd yr. public health 4th yr. legal medicine	Joint lecture	
Thurs.			Individual lecture	
Fri.			Individual lecture	
Sat.				

with legal medicine (Table 8 shows 1 week's program in clinical training).

Allocation of Students to Different Departments

This occurs in the Second Trimester (Sept. to Dec.) of the present academic year (1960-61).

(a-j) stands for the classes in the third year, whereas (A-J) for the classes in the fourth year.

Examinations

Subject and time.—

Basic medicine: In the beginning of the trimester following the completion of each course.

Social Medicine:

1. Hygiene, in the beginning of the trimester following the completion of the course.

2. Public Health, Legal Medicine, immediately after completing each course.

3. Clinical Medicine, Guidance Lectures given immediately after completing lectures in each course.

Final examinations, given immediately after completion of each course (examinations for Internal Medicine are held at the end of the third trimester of the 4th year)

Order in which examinations are taken.—Students must pass examinations in basic medicine before they are allowed to take the final examinations in clinical medicine.

Qualification for taking examinations.—Students must have completed lectures and practical work in each course during the prescribed period before they can take examinations in respective courses.

Special allowance.—Those who requested the postponement of taking examination or those who failed in examination may have another chance in the following period.

Basic Medicine and Social Medicine: During the trimester when examinations are held.

Clinical Medicine and Lectures on Principles: During Guidance, the third trimester of the second year.

Final Examinations of Clinical Medicine: During the period when the clinical training is being conducted.

Grading of examination results.—The results of examinations are graded "'excellent," "good," "fair," and "poor," and marks above "fair" are considered as passing.

Results of examinations following guidance lectures on principles in clinical medicine are marked either 'passing' or 'failing,' but these are not counted in the results of the final examinations.

Comparison of the New and Former Education Systems (with some concrete examples)

Internal Medicine.—

1. Former System: Two professors conducted the course in internal medicine parallel with other courses for a total of 830 hours.

Lectures: In the third trimester of the first year. 4–8 hours per week, total of 148 hours.

TABLE
ALLOCATION OF STUDENTS T
(SEPT.-DE

Week:	1	2	3	4	5	6
C.P.C. (Tues.)	(auxil.)	path. I	(auxil.)	path. III	(auxil.)	path. I
Joint lecture (Wed.)	(auxil.)	(auxil.)	dentistry	surg. I	(auxil.)	(auxil.)
Individual lecture (Thurs.)	radiology	gynec.	surg. II	(auxil.)	(auxil.)	psych.
Individual lecture (clinical training) (Fri.)	int. med. I	(auxil.)	(auxil.)	(recess)	(auxil.)	(auxil.)
Int. med. I	e		E		f	
Int. med. II	j		I		a	
Surgery I	c				d	
Surgery II	h		F		i	
Radiology	d				e	
Otorhino-laryngology	b				c	
Opthalmology	g				h	
Dentistry	i				j	
Pediatrics			J			
Neuropsychiatry			B			
Orthopedic surgery			C			
Obstetrics and gynecology			H			
Dermatology and urology			A			
Elective	a.f.		D.G		b.g	

Practice in diagnosis: In the second trimester of the second year, 4 hours per week, total 56 hours.

Clinical lectures: In the third trimester of the second year and in 2 trimesters of the fourth year, 4 hours per week, total of 296 hours.

Policlinics: In the third trimester of the third year and in 2 trimesters of the fourth year, 2 hours per day at the out-patient clinics, total of 78 hours.

Examinations: In the third trimester of the fourth year; examinations were held in combination with other clinical medicine.

2. Present System: Two professors conduct the total of 624 hours of lessons in this department, dividing the time proportionately between them in the following manner:

a) Guidance lectures of internal medicine:

In the second trimester of the second year—16 hours per week for a total of 208 hours, and in the third trimester of the second year a total of 40 hours within two weeks.

b) Clinical training: Those who completed and passed the examinations of the guidance lectures are divided into ten groups of eight students each. Each group is assigned to each department for 6 weeks in the third year and 6 weeks in the fourth year for the total of 12 weeks. During this period groups of eight students each will receive guidance and practice in various investigations for 26 hours a week for a total of 312 hours. During this period joint lectures will be conducted parallel to the clinical training in the following manner:

Individual lectures—14 times a year; examples of subject: "Latent Hepatitis," "Polycytemia"

Joint lectures—4 times a year; exam-

IFFERENT DEPARTMENTS
60)

7	8	9	10	11	12	13	14
path. II ophth.	path. I otolary.	path. II int. med. I	(auxil.) dermat.	path. I (recess)	(auxil.) int. med. II	path. II psych.	(auxil.) (auxil.)
int. med. II	(recess)	int. med. II	surg. I	pediatrics	gynecol.	dentistry	(auxil.)
(auxil.)	ortho- pedic	(auxil.)	(auxil.)	int. med. I	(auxil.)	(auxil.)	(auxil.)
I F I		g b e j	B D A	h c f a	C A G		
		f d i a		g e j b			
G C B A D			C G J E F	b		I J H D E	
.J		c.h	H.I	d.i		B.F	(Entire)

ple of subject: "Splenic flexure syndrome" (professor of physiology and neuro-psychiatry will cooperate)

Final examinations — The entire fourth-year student body takes the finals at the end of the third trimester.

Obstetrics and Gynecology.—

1. Former System: The courses in obstetrics and gynecology were conducted for a total of 211 hours parallel with other clinical courses in the following manner:

Lectures: In the third trimester of the second year and in two trimesters of the fourth year—2 hours per week for a total of 74 hours.

Clinical lectures: In the third trimester of the third year and in two trimesters of the fourth year, 2 hours per week for a total of 74 hours.

Policlinics: In the third trimester of the third year and in the first and second trimesters of the fourth year, for a total of 37 hours.

Obstetrics manekin practices: In the third trimester of the third year, 1 hour per week for a total of 11 hours.

Examinations: In the third trimester of the fourth year, conducted in proper combination with other clinical courses.

2. The Present System: Intensive clinical training course is given after completing the lectures of guidance on the principles of obstetrics and gynecology. The total of 138 hours spent for this course is divided in the following manner:

Lectures of guidance: Lectures are conducted for 2 consecutive weeks during the third trimester of the second year for a total of 40 hours (Table 10).

Clinical training: Those who completed and passed the examinations of the guidance lectures are divided into ten groups of eight students each. Each group is assigned to the department of

TABLE 10
SCHEDULE FOR GUIDANCE LECTURES IN OBSTETRICS AND GYNECOLOGY

Lectures	Practices
1. Anatomy and physiology of female generative organs (2 hrs.) Ovary Uterus Menstruation Fallopian tubes Vagina Pelvic floor Vasa and nerves Life history of females	
2. Physiology of pregnancy (2 hrs.) Fetus and its appendages Maternal physiology in pregnancy Signs of pregnancy Diagnosis of pregnancy Diagnosis of life or death of fetus Antepartal care	Pregnancy tests
3. Physiology of labor (3 hrs.) Birth canal Forces concerned in labor Fetus Clinical course of normal labor Mechanism of labor Conduct of normal labor	
4. Puerperium and newborn Puerperium Newborn	
5. Gynecologic and obstetric examination Abdominal and pelvic examination Adjuvant examination	
6. Symptomatology in gynecology (2 hrs.) Menstrual disorders Uterine bleeding Leukorrhea Low abdominal pain and backache Abdominal enlargement Dysuria	
7. Gynecologic endocrinology (2 hrs.) Endocrine physiology Menstrual dysfunctions	
8. Congenial anomalies, injuries and displacements of female generative organs	
9. Inflammation of female generative organs	
10. Tumors of female generative organs (4 hrs.) Carcinoma of cervix Carcinoma of corpus uteri Myoma of uterus Adenomyosis of uterus Sarcoma of uterus Tumors of ovary Hydatidiform mole, choriocarcinoma and other tumors	Vaginal smear (*Papanicolaou*) Colposcopy (*Hinelmann*) Curettage Biopsy
11. Infertility, sterilization and male infertility Female infertility, sterilization Contraception	Basal body temperature study Tubal patency tests
12. Operative gynecology	
13. Physiotherapy in gynecology	
14. Toxemias of pregnancy (2 hrs.)	

Lectures	Practices
15. Coincidental complications of pregnancy (2 hrs.) Acute and chronic infectious diseases Circulatory, urinary and other diseases Congenital anomalies and displacement of generative organs Tumors of generative organs	
16. Abnormalities of duration of pregnancy Abortion, premature labor Prolonged pregnancy	Dilation and curettage
17. Abnormalities of implantation of conceptus Ectopic pregnancy	Pelvic puncture Culdoscopy
18. Abnormalities and diseases of conceptus Diseases of fetus Diseases of fetal membranes Abnormalities of umbilical cord Abnormalities of placenta	
19. Multiple pregnancy	
20. Dystocia due to anomalies of expulsive forces and birth canal	Pelvimetry
21. Dystocia due to anomalies of fetus and its appendages (3 hrs.) Abnormalities in position, presentation of fetus and in mechanism of labor Abnormalities in attitude of fetus Abnormalities in lie of fetus Abnormalities in size of fetus Placenta previa Abruptio placentae	
22. Injuries to birth canal during labor	
23. Abnormal post partum hemorrhage Atony of uterus Inversion of uterus Others	
24. Puerperal infection and neonatal morbidity Fetal distress during labor Diseases of newborn	
25. Outline of operative obstetrics (2 hrs.) Low forceps Breech extraction Cesarean section Version and others	

obstetrics and gynecology for 3 weeks. These eight students receive the bedside guidance course and observe operation and patients in hospital and practice various tests (studies on hormone centers, basic metabolism and cytologic examinations) for 26 hours a week for a total of 78 hours (not including the duty hours at the maternity ward). During this period joint lectures are conducted paralleling this training in the following way.

Individual lectures—4 times a year; example of subject, "Dystocia."

Joint lectures—once a year; example of subject, "Lumbago in Women" (professors of orthopedic surgery, dermatology and urology will cooperate).

Final examinations — Each group take final examinations immediately after completing the 3-week clinical training.

Otorhinolaryngology.—

1. Former system: This course was conducted parallel to other clinical courses for the total of 122 hours in the following manner.

Lectures: In the third trimester of the

second year and in the first and second trimesters of the third year, 1–2 hours per week. Total, 48 hours.

Clinical lectures: From the third trimester of the third year to the first and second trimesters of the fourth year, 1 hour per week. Total, 37 hours.

Policlinics: From the third trimester of the third year to the first and second trimesters of the 4th year; diagnosis in the out-patient clinics, 2 hours per day totaling 37 hours.

Examinations: In the third trimester of the 4th year, in proper combination with other clinical medicine.

2. The present system: Intensive clinical training is conducted for 106 hours in the following way after completing lectures of guidance of otolaryngology.

Lectures of guidance: The lectures are conducted for 2 consecutive weeks during the third trimester of the second year for a total of 20-24 hours.

Clinical training: After completing and passing the examination following the guidance lectures, the students are divided into ten groups of eight students each during the first and second trimesters of the third year, and each group is assigned to the department for a period of 3 weeks. These students receive bedside guidance, observe operations, and carry on various tests and investigations 26 hours a week for a total of 98 hours. During that time joint lectures are given parallel to this training.

Individual lecture—once a year; example of subject: "Cancer in the field of Otorhinolaryngology."

Joint lecture—once a year; example of subject: "Nasal Optic Neuritis." (Professor of ophthalmology will cooperate)

Final examinations—Immediately after completing the 3-week clinical training each group takes the finals.

HOW LECTURES ARE TO BE CONDUCTED AND INSTRUCTION CARRIED OUT

Since the budget does not permit any increase in the personnel required for handling each department, a small teaching staff (all full-time) is obliged to carry on the functions:

1. Duties of teaching in the Medical School and in the Postgraduate School of Medicine.

2. Research work of their own and direction of research works of other members of the same department.

3. Rounds of the hospital for diagnosis and treatment of patients.

In our country the education of students is conducted by the teaching staff in charge of the class only within the university compound. It is impossible to teach in hospitals or in research institutes located outside the university or to ask persons working at such hospitals or institutes to help teach in the university, except in some special cases, because of the limited budget available. However, in our Medical School we request such persons who have had teaching experience in the past, so that they are well qualified to teach, to come to the Medical School as *attendant lecturers* without any remuneration to teach in the field of their specialty. In this way we can alleviate the heavy burden of the staff in charge to a certain extent. Therefore, by our method of education the share of each professor, assistant professor, and lecturer (including attendant lecturers) for guiding students in clinical medicine is on the average of 3–6 hours per week.

SUMMARY

The new system of education actually practiced in our Medical School is an epochal improvement on the former generalized system in Japan, and this has been amply substantiated by the results of the past few years. On the other hand, as we have been endeavoring our utmost to design a better plan and improve the teaching conditions within

TABLE 11
NUMBER OF TEACHING STAFF, RESEARCH FELLOWS AND POSTGRADUATE STUDENTS (OKAYAMA)

	Number of lectureship	Prof.	Assistant professors	Instructors	Assistants	Research fellows	Postgraduate students	Number of beds
Basic Medicine	13	13	13	7	34	42	15	—
Clinical Medicine	14	14	14	16	79	601	97	774
TOTAL	27	27	27	23	113	643	112	774

Note: The total number of the students in the Medical School amounts to 339.

the permissible range of the budget at our disposal, we hope to be able to better our medical education by further planning, should there be an increase in the teaching staff and even a slight expansion or addition of facilities in the future.

Since a limited number of professors are in charge of both teaching and research work (including treatment of patients), it is only natural that there is always a limit to their capacity; thus, they cannot fully put their entire energy and resources into the education of students. Consequently, there arises the desirability of hiring attendant lecturers with some salary to lessen the burdens of our teaching staff to some degree, but this is not possible in view of the limited budget (only about Y50,000 (approx. $140 a year); and, therefore, we have no recourse to compensate for the lack of teaching personnel at present.

For the smooth functioning of medical education it is needless to say that facilities and equipment are essential, but as we have the meager sum of about Y2,000,000 (approx. $5,550) per annum for educational facilities, aside from the regular allowances for the management and administration of the school, we can barely renew and supplement the minimum requirements.

Such difficulties may not be overcome for a long time to come under existing conditions in our country. However, one should never condone the former passive educational system, and the attempt to overcome these difficulties in our school is perhaps the first of its kind in our country. The Board of Superintendents for Medical Education, Tokyo, in charge of the Japanese education system, discussed the problems seriously, and they visited our school in November, 1960. Since then some medical schools have begun to take a considerable interest in the system we now employ and have dispatched observers to Okayama successively. Every one of the observers recognized a dire need for improving the note-taking major lectures, but how a heavy burden imposed on the small teaching staff in guiding students could be minimized always appears to be a great problem.

I have discussed the actual situation of medical education in our school, and I should be happy to receive any criticism and advice from the readers.

ACKNOWLEDGMENT

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Succinct Plan for Medical Studies

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SUMMARIO

Iste cyanogramma pro studios medical, per un physiologo francese, comencia con le question de como evalutar lor valor. Ille crede que le test le plus objective esserea le longevitate de un population date. On da prime loco in le formation medical al recerca biologic e physiologic. In estimation de lor qualitate, le numero de laboratorios e travaliatores recerca se considera un factor essential. Proque le inseniamento debe esser adaptate al studiante il es necessari de saper como e quando illes son recrutate. Le factores que interveni in le election de un carriera medical, specialmente in Francia, son examinate e on conclude que in general, il ha nulle vocation medical e que le selection es plus tosto le resultato de un processo spontanee de elimination. In despecto de iste, le procentage de studiantes (10%) qui deveni multo ben medicos es considerate satisfactori. Recrutamento per examines competitive es rejectate, ben que on concede que cata pais debe optar le modalitate de examine in accordo con su temperamento. Un examine del principios general pro le organisation de studios medical los dividerea in duo cyclos principal. In le centro del prime, de duo annos e medio de duration, on placia physiologia e morphologia. Le secunde, del mesme duration, pro un parte, super chirurgia e medicina internal, e pro le altere parte, super pathologia e medicina experimental. Cata campo special debe esser coperite per un examine special. On discute in detalio le characteristicas principal del curriculo e le varie methodos de inseniamento applicate al duo cyclos. On prende in consideration etiam le problemas del personal docente (e.g., le crise in le recrutamento de membros personal pro departimentos de scientias basic).

It was perhaps rather inconsiderate to accept the proposal of Dr. J. Z. Bowers, editor of *The Journal of Medical Education* to write a paper concerning our views on medical studies. It was a great honour for me to be requested by a foreign journal of such high standard. My consent is perhaps justified by the fact that I have taught physiology for more than 30 years in the Faculty of Medicine of Strasbourg—after having been an assistant in Neurology and Medicine for 2 years. Thus, my medical training has been above average for a specialist in one of the basic sciences. These 30 years gave me the opportunity to see what happened to a great number of our students and also to witness the deep transformation of the medical sciences since 1920.

In all countries the medical studies have undergone a critical period. This is due to the enormous growing of our knowledge. Before World War I the teacher had time and the possibility to delve deeply into the many aspects of every major problem and could thus maintain a fairly coherent view of all aspects of the medical analysis. Today the gigantic number of facts to be obligatorily absorbed involves even in high school an increasing demand on the pure memory instead of a reduced quantity of more operative knowledge relevant to many different problems.

HOW TO JUDGE MEDICAL STUDIES

Is there a valuable test for judging the efficiency of medical studies? I think that the most objective test would

be the longevity of a given population. Two hundred years ago, J. J. Rousseau said that he would believe in medicine when the life-span would be lengthened. It is obvious that longevity depends upon the sanitary conditions; but the correlation between these conditions and medical studies is not a direct one, although we are convinced that at last longevity is the result of the social activity of the physician. If the physicians of a country are really willing to abolish a plague such as alcoholism, alcoholism will disappear, and any Parliament will vote the necessary laws.

Everybody knows the effects produced on longevity by the discovery of insulin and antibiotics. The great fame of Pasteur in France is due not to the discovering of glycolysis and oxidation but to the impulse given to the manufacturing of serums and vaccines.

Biological research and physiological research are most important factors in medical progress, and it is absolutely necessary to put them in first place among medical studies. Do we have a valuable test for judging the quality of biological or physiological research? It is evident that the number of laboratories and of people working there is an essential factor. Quality of research is supposed to be judged by the national academies. Those interested in the history of sciences and medicine know which were the topics proposed by the different European academies in the beginning of the last century and the very important answers; but the number of biologists at that time was very small, and the sciences were more international than today.

Nowadays the Academy of Stockholm has become an international judge via the Nobel prizes, and I may say that its appreciations are among the least biased in the scientific world. The mere reading of the list of the Nobel prizes will show in which countries medical research has the highest returns.

RECRUITING OF MEDICAL STUDENTS

On this point I can only make some suggestions, having not had time enough for a real statistical study. Obviously, teaching must be adapted to the students. It is, therefore, necessary to know how and where they are recruited. In France the interest for biological sciences is much less than in Anglo-Saxon countries. Therefore, the teaching of natural sciences is neglected in schools and colleges. The same observation was true for Germany before World War I, during my childhood and youth. In France the good pupil is the one who has the best quarterly reports either in mathematics or in Latin or Greek or philosophy. After graduation from high school, this brilliant pupil is well prepared to enter in one of the top-level academic establishments like Ecole Polytechnique, Ecole Centrale, Ecole Normale Supérieure or Ecole des Chartes. All these schools have a limited number of students. The other students go to universities. They are less distinguished and show less inclination for mathematics or literature. It is in this group that the future physicians are found. Like the law students, they show no preference for literature nor for sciences. Hence, the selection of medical students proceeds first by a spontaneous elimination of fields of interest. Another factor intervenes in choosing the medical studies: it is the economical status of the family. Medical studies are still supposed to be long and expensive, though a good student should be able to earn his living after 3 years, as is the case in most other studies. However, he has to pursue his studies for another 3 years. Despite these factors the mean level of the medical students is better than could be hoped, the

absence of an initial preference being not a handicap for the medical profession.

Our 30 years' long experience suggests that at least 10 per cent of the students can be assumed to become very good physicians. We consider this percentage quite satisfying. This view would be easily confirmed by a survey conducted on a sufficiently large number of medical students. It should be based: (*a*) on the quarterly reports during the 3 last years in the secondary school in mathematics, physics, chemistry, philosophy, Latin, and Greek; (*b*) on the results of the examinations during the medical studies; (*c*) on the final professional quality.[1]

To sum up: there is no medical vocation. The choice is the result of a spontaneous elimination process. Yet the intellectual level is better than could be foreseen.

WHERE DO MEDICAL STUDIES LEAD

Schematically we can summarize the destiny of medical students as follows:

1. Most of them will become physicians with sometimes a partial specialization acquired by practice but not recognized by a special examination.
2. The second group will follow a special training acknowledged by an official qualification diploma; this second group will be partly identified with the third group.
3. The third group is formed by physicians of the second group, having an official department in a hospital.
4. A small proportion of specialized physicians will be in charge of teaching their specialty in a medical school.

[1] Such a survey seems to have been realized in Munich, Germany (personal communication of Professor Brecht).

Besides these normal evolutions there is a small number of students who abandon medical practice to enter different laboratories: the majority will be employed in private or official laboratories of biological analyses; the very few remaining will enter biological laboratories in universities. In this number we shall find the future teachers of all basic medical sciences: biology, anatomy, histology, embryology, biophysics, biochemistry, physiology, pharmacology, hygiene, bacteriology, parasitology, and pathology.

In spite of this large variety of medical studies, the one same official diploma, the M.D. Thesis, entitles all these different functions. This situation is amazing if one considers the complicated hierarchy of diplomas required for school teachers or engineers. In fact, this is not absolutely true, since some countries rely on a selection through competitive examinations organized mainly by the governmental bodies in charge of Public Health or Education. This duality leads to a number of complications, very difficult to avoid. The principle itself of competitive examination, which at first glance seems the most democratic, is at least open to question. Even if the competitive examination is perfectly impartial, it has two unfavorable consequences:

1. The rights thus obtained encourage too greatly the spirit of independence and by this fact destroy the ability for cooperation in a team.
2. The chief of the department feels less responsible for a co-worker not chosen by himself but imposed by his diploma.

Furthermore the competition in intellectual matters favours too much the quickly reacting candidate. However, we think that some slowness is often combined with tenacity and intellectual firm-

ness, which may be much more important for a creative research work.

These reasons make us tend to condemn the recruiting by competitive examination. However, it seems probable that every country has chosen the mode of examination most in accord with its temperament.

GENERAL PRINCIPLES FOR ORGANIZATION OF MEDICAL STUDIES

Though the choice of medical studies is not the expression of a special intellectual inclination, it remains true that every medical student is interested first of all in the knowledge of the human being. His profession will bring him in contact with ill as well as normal men. Therefore, it is necessary that the first step of the medical studies will not consist only in botanical, zoological, physical, and chemical exercises without any relation to human beings. My own experience was rather a disappointment in the beginning. Therefore, I think that the student should come immediately into contact with patients, and I suggest very strongly that all students of medicine of both sexes should begin their studies by 6 months of nursing in hospital wards (surgery, gynecology, pediatrics, and even in infectious diseases). This probation term could take place in any hospital agreed by the medical school. Only after this 6-month term should the student be admitted in a medical school.

The medical studies *stricto sensu* are divided in different cycles. At the end of each cycle an examination ratifies the acquired knowledge. The number of cycles to be accomplished should depend upon the final profession chosen by the student.

First cycle.—In the center of the first cycle I place physiology. Every physician must understand the different functions of an organism and their mutual relationships. If he does not understand the normally regulated human machinery he will never understand the reason why a particular symptom or a particular test procedure is more significant than another. This is true as well for diagnosis as for prognosis. The length of this first cycle should be 2½ years, during which the student would have no access to the hospital. This first cycle could be the same for medical students, students in biology, and veterinary students. The final examination of this cycle would give the right to:

1. Continue the medical, biological, and veterinary studies,
2. Teach biology in secondary schools,
3. Be monitor in laboratories of biology and basic medical sciences, and
4. Be technical assistant in laboratories of medical analyses.

Second cycle.—The second cycle should also last for 2½ years. It would be centered on the one hand on surgery and internal medicine, and on the other hand on pathology and experimental medicine. The student would remain 1 year in a medical service and in medical specialities (neurology, gastroenterology, cardiology, tuberculosis, etc.) and would spend the other year in a surgical service with specialties dependent on it (urology, otorhinolaryngology, ophthalmology etc.). The last ½ year would be in gynecology, pediatrics and psychiatry. A final examination should close these studies and entitle the candidate to work as a full-time assistant in a hospital under the supervision of a chief of department. All public hospital services, but no private clinics, could be allowed to employ these students. The choice of the places could be determined by the marks obtained in the final examination. During this time the student should prepare an essay of 20–

30 pages, concerning a clinical case. This thorough observation would not have to be accompanied by a bibliographic study. This paper would have to be deposited at the Dean's office of the medical school where the student underwent his second cycle. This work would be evaluated by the professor teaching in the field to which the paper belongs and would give, if admitted, to its author the title of doctor in medicine.

In summary: the total duration of medical studies would be 6.5 years (6 months, nurse duty; 2.5 years, first cycle; 2.5 years, second cycle; and 1 year, as assistant). This length of time is surely not overestimated, considering the responsibility of the physician, the complexity of medical knowledge, and the social prerogatives of the medical profession.

The examinations.—I am convinced that each special field has to be covered by a special examination. I am strongly against the procedure of averaging the marks[2] obtained in the various fields, and also against limiting the number of times the same student is allowed to try a given examination. This means that a minimum of time would be required for each cycle, but that no upper limit should be fixed; after every failure, the student would be allowed to another trial after 3 months.

MAIN FEATURES OF THE MEDICAL STUDIES CURRICULUM

First cycle.—The first cycle is centered on physiology and is common to all students in medicine, biology, and veterinary art. This cycle will be realized by a complementary teaching in the faculties of sciences and medicine or (what seems much better) in large biological institutions. Two fundamental subjects are taught: morphology and physiology, the two main aspects of biology.

The morphological studies concern the human organism and the typical representatives of the different zoological classes. Anatomy concerns as well the classical macroscopic anatomy as embryology and histology. Practical exercises are to be effected in all these sections. One-third of the time is attributed to practical laboratory work, a second third to seminar exercises (ten to twenty students for one assistant), completed by a great number of moving pictures; the last third in formal "ex cathedra" lectures.

In many countries this first cycle is approximately realized as I propose it. However, I think that the anatomy and the histology of the central nervous system are not sufficiently developed compared with the other tissues and organs. In few organs only structure and function are as intimately related as they are in the nervous system. Thus, knowledge of nervous structure is still today an essential element for understanding nervous function. The anatomical studies shall not be the basis for surgical techniques but must aid in the understanding of the relationship between the peculiar shape and structure and the special function. The student must see the normal place of the organs and their spatial relations. He shall know the *weight* of the organs. The study of embryology ought essentially to make understood the manner by which a function is developed. The studies of zoology and microbiology shall show the common general properties of living matter and also explain the differentiation of function in the animal kingdom. During the first cycle genetics, especially human genetics, are to be taught. Here the student is likely to get also a training in elementary statistics.

In the center of the first cycle is physiology. However, to understand phy-

[2] To enter university a mean minimal scientific education is necessary, but afterwards no medical studies can be neglected.

siology the student must have some knowledge in chemistry and biophysics. What he has learned in the secondary school in physics and chemistry needs at least to be refreshed. The student must not be handicapped by ignoring a chemical formula or a physical or mathematical equation. Chemistry and biophysics are necessary in the understanding of nutrition, pulmonary ventilation, hemodynamics, electrical properties of the living tissues, as well as to enable the physician to use the techniques of quantitative physical or chemical measurement. However, there is no need to change the medical student into an engineer. As well as morphology, biology must be learned equally by practical exercises and theoretical lectures. This part of the teaching should take two-thirds of the time. The last one-third is employed in seminars (one assistant for ten to twenty students).

Within physiology should be included psychophysiology. The knowledge of sensory functions should be considered from a more psychophysiological point of view than is commonly taught today. The physiological basis of psychology will perhaps secure the future physician against the artificial constructions of psychoanalysis. Psychophysiological studies will also enable the student to use the elementary knowledge in statistics which he has acquired in genetics. The examination concerning practical exercises will be as important as that concerning theoretical knowledge.

This first cycle of medical studies is only the first step toward the medical profession, but it is sufficient for teaching biology in the secondary schools. It must, therefore, be complete and needs great biological institutes with many different departments. In the morphological section of such an institute I would see a department of human anatomy, of comparative anatomy, of histology, embryology, etc. Each department should have its chief, with a variable number of assistant-professors, each of them being helped by three to five assistants and the same number of technical personnel. A similar organization would fit all the other institutes. The presence of an engineer is absolutely necessary in every institute. Furthermore, the engineer should not be given a feeling of superiority for having provided the apparatus used by the biologist.

The fact that the first cycle permits the student to accede to a place of monitor in the biological laboratories will insure a first possibility of recruiting junior staff for the research laboratories which suffer some disfavour at the present time.

Second cycle.—The second cycle will be concerned essentially with clinical medicine. The importance of attendance in hospitals is well known. In this respect, clinical education is not fundamentally different in the different countries.

The student becomes acquainted with ill people. For each group of five students, twenty patients would be a ratio favourable to a good teaching. The teaching of the basic sciences concerning the second cycle—i.e., pathology and experimental medicine, is less uniformly developed from one country to the other than clinical education. I think that an uninterrupted 2 weeks' attendance on the autopsy service is reasonable. The teaching of pathology must be completed by moving pictures, by the examination of macroscopic pieces, and by histological studies.

For experimental medicine, I would suggest a rather large number of different teachers, about 3–5 times the numbers of clinical departments. This would allow for a sufficient number of assistant professors knowing perfectly a limited amount of experimental medi-

cine. Each clinical department, with each one director, will have several divisions (internal medicine with divisions of gastroenterology, cardiology, infectious diseases, etc.); the chief of each division will have his specialty in experimental medicine as close as possible to his clinical specialization.[3]

The largest part of clinical education should take place at the patient's bedside with subsequent discussions and seminars. Furthermore, I consider that one weekly *ex cathedra* lecture is absolutely necessary. This lecture must contain a great number of pathophysiological considerations. It must go beyond the mere clinical point of view.

To the second cycle also belong two further basic sciences: pharmacology and hygiene; but I do not think it necessary to have a special professorship in therapeutics. The practical knowledge of it shall be acquired during all the clinical training, while theoretical therapeutics are contained in pharmacology and experimental medicine. I think that great institutes of pharmacology, with many divisions, as for other institutes, are a necessity.

The program of hygiene during the second cycle is very different in the various countries. Everywhere hygiene *stricto sensu* is taught sufficiently and uniformly. This is not true for hygiene in a larger sense, namely, hygiene in nutrition, in clothing, and housing. These general problems of hygiene should be taught by the professor of applied physiology.

A last branch of knowledge, very often neglected, is the history of science, which I believe could bring to the student a ripeness of judgment quite necessary for the physician whose situation is independent and full of responsibility.

Forensic medicine takes place in the second cycle but can be taught only in its very elementary principles.

The conclusion of the second cycle consists in one final examination covering all disciplines of this cycle. It is evident that in each department the student shall be questioned independently. If he does not reach the required mark he will be sent back for 3 months. The final hospital full-time attendance of 1 year shall precede the final examination. It is necessary that each physician practice medicine for 1 year under control before he is authorized to practice under his own responsibility.

Having succeeded in his examination, accomplished his hospital term, and written his clinic observation, the student obtains the title of doctor in medicine.

Third cycle.—The third cycle is necessary for every specialist. In opposition to the hospital terms of 1 year in the second cycle, the third cycle can take place only in a university department. Its length is of 3 years for all specialities. It is ratified by an examination consisting only of a practical exercise. It is probable that the young surgeon thus taught will not be able to face all operations, but he will be competent for emergency cases. If he does not succeed satisfactorily in this examination he will be sent back for 1 year. It is the only case in which a

[3] It is evident that these divisions cannot be imposed upon the director of the clinical department of internal medicine. They can only arise by affiliation. To be a good gastroenterologist, one has to be also a good internist—but a good internist does not need to have an exhausting knowledge of all the techniques involved in gastroenterology. The specialist must be able to contribute to the advancement of his specialty, and therefore he has to master all the up-to-date knowledge and to be endowed with a sound judgment. The relations between the department and its divisions will depend on the personality of the chief of the division, especially on his abilities for experimental investigation; he will have more freedom, the greater his capacities.

period of as long as 1 year appears necessary, in opposition to all other examinations for which 3 months seem sufficient.

THE TEACHING PERSONNEL

In many countries there exists today a crisis in recruiting staff members for basic science departments. We have already explained the importance of physiology in the medical studies. How can we realize a physiological education if the physiological laboratories are progressively abandoned? A first category of co-workers will be found after the first cycle examination. If the monitor thus recruited wishes to progress in title and responsibilities, he must accomplish a second cycle of studies, of 2.5 years. This cycle shall be accomplished in biochemical, biophysical, and physiological laboratories. The stay in these laboratories (biochemical, biophysical and physiological) is also necessary for the future assistants in morphological branches. This second cycle will be theoretical as well as practical. The practical part being the most important, I propose every day a 5-hour stay in the laboratory and 1 hour of theoretical lessons. These lessons are to be really of an advanced level. The daily laboratory work with the assistants and frequent seminars will enable the training of assistants really valuable for all branches in basic medical sciences. A final examination after this stay of 2.5 years shall include theoretical and practical exercises in the three branches. The diploma thus acquired shall confer the title of assistant. If the student wishes to enter secondary school he will have a better paid teaching position than he who enters the secondary school after the first cycle only.

The assistant who stays in the laboratories will now begin his personal experimental work, becoming a histologist, a biochemist, a physiologist, etc.

To acceed to the title of assistant professor, further personal work is necessary, consisting of a thesis. Three to five years are necessary and sufficient for this work.

The future assistant professor and professor for a clinical discipline shall also be obliged to work at least 1½ years in a biochemical, biophysical, or physiological laboratory. A minimal stay of this length is necessary for the experimental medicine which is part and parcel of his clinical specialty. The professorship will be conferred by choice to the assistant professors by the council of the medical school.

CONCLUDING REMARKS

These very brief proposals for medical studies are written by a physiologist having had a thorough medical education. It is probably the reason why he insists so much on the necessity of early and careful physiological education for physicians. He is convinced that the professor of clinical medicine, having to do, besides his clinical work, very important experimental work, needs a very thorough physiological education. On the other side, the professor of physiology, of biochemistry, of biophysics, and of biology must never be handicapped by an insufficient physical, mathematical, or chemical education. For the morphological branches we think that the same physiological education as for the clinical ones will be sufficient.

In this plan we have also been guided by another consideration. The laboratories of basic medical sciences are more and more abandoned. The difficulties in recruiting are due to two factors: (*a*) the manner of reaching a position of responsibility is very long and very complicated; (*b*) these places are not sufficiently paid.

Just like the clinician, the basic scientist has two functions: he teaches, and he pursues experimental research. There is no discussion that the teaching in basic sciences (except the classical anatomy) is much heavier than in clinical medicine, where the teaching is almost limited to the medical specialization. We think, therefore, that the teacher of basic sciences should be paid twofold: (*a*) one salary for the teaching function and (*b*) a second salary for research. This second salary is not definitively fixed, it must be proportionated to the number and quality of research judged by a committee of scientific personalities. We consider that the responsibility for basic medical teaching is so important that it must have the ratification which it deserves.

Medical Education in the Arab Middle East

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The Middle East as a whole (Chart 1) is too large and diversified an area to discuss coherently from the standpoint of medical education. Therefore, we wish to focus attention on the Arab States only. The Arab Middle East consists of the Arabic-speaking portion of the region (Chart 2, Table 1). The predominant Arabic language and culture make for a potentially free exchange of health personnel and ideas across national boundaries. Although the medical programs of the various countries are not now integrated in any way, there will doubtless be more collaboration in the future. Thus, the Arab Middle East is a logical geographic unit for study.

Health conditions.—The influence of terrain, climate, and socioeconomic factors on health in the Middle East was previously reviewed in detail (23). It was pointed out that the major health issues of the Arab Middle East are neither unique nor obscure and that they are similar to those in other developing areas. For example, there is a prevalence of infectious and parasitic diseases attributable to ignorance and poverty. Health hazards can be diminished but will continue to be serious until standards of education and living are improved. Meanwhile, local governments and international agencies (especially the World Health Organization, and the United States International Cooperation Administration) are giving special attention to public health programs in an effort to reduce infant mortality and the toll from such endemics as malaria, bilharziasis, trachoma, and tuberculosis.

Infant mortality is a sensitive index of living and health conditions. In advanced countries, the infant mortality rate is 25–30 per thousand live births. By contrast, the over-all infant mortality for the Arab Middle East is probably 150 per thousand. In the Arabian peninsula and other remote areas it is possibly 500 per thousand; that is, half the children die before the age of 1 (18, 21). It is pertinent to remark here that vital statistics, including population estimates for the region, are of limited accuracy and usually represent educated "guesses" based on small samples.

The state of health varies from place to place. Lebanon is relatively well developed from a medical point of view; Iraq, Jordan, and the United Arab Republic are in an intermediate category; and health conditions are frankly primitive in most of the Arabian peninsula and Sudan. There is also a contrast between the urban and the rural or pastoral areas. The major cities are modernizing steadily, so that a small fraction of the urbanites in each country lives well, as any traveler to the Middle East can readily see. A fortunate few in the cities can obtain medical service of high quality, especially if able to afford private care. Most of the rural or pastoral people, however, have restricted or no access to health facilities. This is particularly true in the Arabian peninsula and Sudan and in the remote districts of the region where living pat-

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TABLE 1

POPULATION, SURFACE AREA, AND ANNUAL RATE OF INCREASE IN THE ARAB MIDDLE EAST, 1958 (21)

Country	Population	Area sq. km.	Annual rate of increase (1953–1958) per cent
Aden Colony	148,000	194	....
Aden Protectorate	650,000	290,080	....
Bahrein	139,000	598	3.8
Kuweit	210,000	15,540	....
Muscat and Oman	550,000	212,380	....
Qatar	40,000	22,014	....
Saudi Arabia	6,036,000	1,600,000	....
Trucial States	86,000	83,600	....
Yemen	4,500,000	195,000	....
Arabian Peninsula	(12,359,000)	(2,419,406)	
Iraq	6,590,000	444,474	2.6
Jordan	1,580,000	96,610	3.0
Lebanon	1,550,000	10,400	2.8
Palestine—Gaza Strip	345,000	202	....
Sudan	11,037,000	2,505,823	....
United Arab Republic:			
Egypt	24,781,000	1,000,000†	2.4
Syria	4,283,000	184,479	3.9
	62,525,000	6,661,394	
	For Comparison		
United States	174,782,000	9,363,387	1.7

* That part of Palestine under Egyptian administration since the Armistice of 1949.
† Area of inhabited and cultivated territory, 34,815 sq. km.

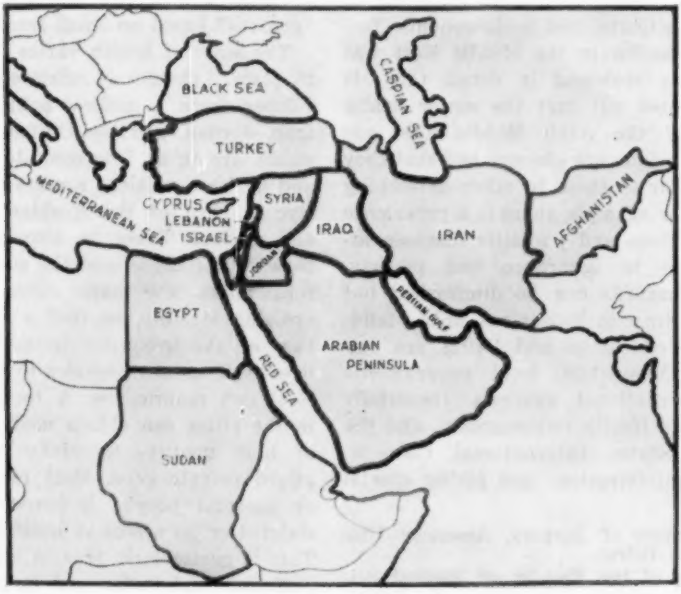

CHART 1. The Middle East.

terns have not changed for hundreds of years.

There are two major requirements for effective attack on the health problems of the region: (*a*) the training of an adequate number of doctors and other health workers and (*b*) the development of health services and facilities. The magnitude and urgency of these basic activities make them a government responsibility. Regional schemes, which place the health assets of certain areas at the disposal of less favored ones, now have limited practicability for political and administrative reasons. Therefore, plans are being evolved by the separate states according to their individual requirements, resources, and governmental philosophy.

The World Health Organization has already made health surveys in every Middle Eastern country. WHO has also sponsored studies of medical programs suitable for developing areas (3, 25). As a result of these studies, specifications are available for integrated systems of medical care involving rural health units, regional hospitals, and urban medical centers. Such plans can be or are being adapted to local conditions in every country. However, implementation is difficult because of the lack

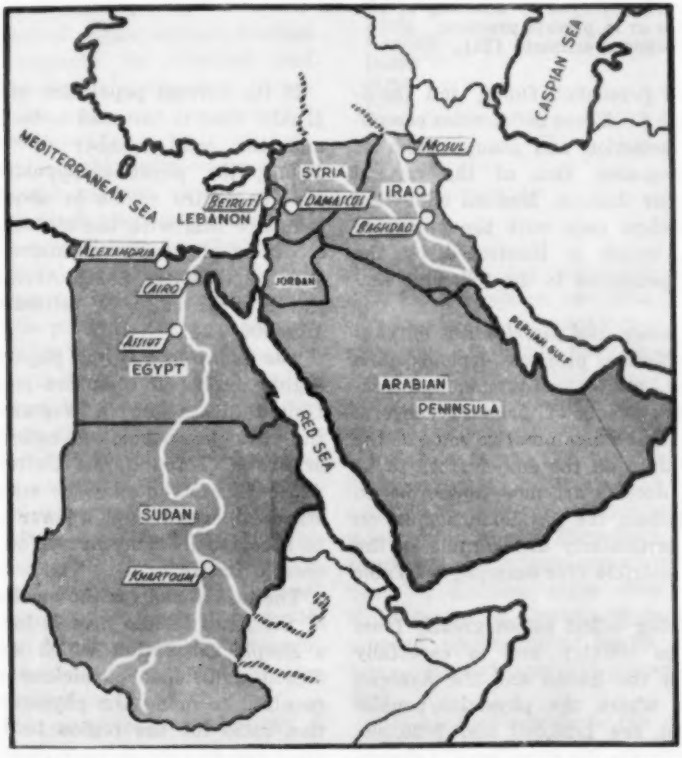

CHART 2. The Arab Middle East and the cities containing medical schools.

TABLE 2

Country	City		MD/Pop.	Province		MD/Pop.
Iraq (9)	Baghdad	—	1/1888	Nassariya	—	1/25,314
Syria (13)	Damascus	—	1/1769	Sweida	—	1/11,250
Egypt (14)	Cairo	—	1/900	Assiut	—	1/10,000

TABLE 3

PHYSICIAN TO POPULATION ON RATIO IN SELECTED COUNTRIES OF THE ARAB MIDDLE EAST

Country	Year	Physicians	Population	M.D. population
Aden Colony (22)	1956	40	143,000	1/3576
Aden Protectorate (22)	1956	14	431,000	1/30786
Iraq (13)	1959	1,428	6,590,000†	1/4615
Jordan (22)	1957	213	1,527,000	1/7170
Lebanon (17)	1959	1,445	1,547,000	1/1071
Saudi Arabia (8)	1958	203*	6,036,000	1/29734
Sudan (16)	1960	270	10,262,000	1/38008
United Arab Republic:				
Egypt (22)	1956	7,666	23,410,000	1/3054
Syria (20)	1959	966	4,421,000	1/4577
United States (15)	1960	237,766	180,126,000	1/758

* Doctors employed by Ministry of Health. Does not include physicians engaged by companies or in private practice.
† 1958 census estimate (21).

of trained personnel, funds, and facilities (Table 6). These deficiencies complicate the selection and inauguration of health measures. One of the critical needs is for doctors. Medical education must somehow cope with the physician shortage, which is illustrated by the statistics presented in the following section.

The number and distribution of physicians.—Medical progress depends upon physicians, and so the number and location of doctors is of primary concern. Tables 3, 4, and 5 summarize some of the available data on the subject. As to be expected, doctors are more numerous in cities, whereas the physician/population ratio is particularly unfavorable in the outlying districts (for example, see Table 2).

The doctor deficit varies greatly from country to country and is especially marked in the Sudan and the Arabian peninsula where the physician/population ratios are 1/38,000 and 1/30,000, respectively. On the other hand, Lebanon has a ratio of about 1/1000.

If the current population of the Arab Middle East is assumed to be 66,000,000 and the total number of physicians 16,000, the physician/population ratio for the entire region is about 1/4000. Compare this with the situation on the continent of Africa (exclusive of Egypt and the Union of South Africa), where the over-all ratio is estimated to be 1/20,000 (24).

The requirements for physicians.—In highly developed countries such as the United States and in Western Europe, the physician/population ratio is 1/1000 or above (1/750 in the United States) (15). This ratio may be considered a standard, even though a lower ratio must be accepted in many areas for the foreseeable future.

The task ahead for the medical schools of the Arab Middle East is indicated by a simple calculation which shows that 50,000 additional physicians would be required to bring the physician/population ratio for the region to 1/1000. It must also be kept in mind that the population is increasing at about 3 per cent,

TABLE 4
RATIO OF POPULATION TO PHYSICIANS IN SYRIA, 1959 (20)

District	Population	Physicians	No. inhabitants for each physician
Damascus	812,320	459	1,769
Aleppo	1,293,176	220	5,878
Homs	424,029	64	6,625
Latakia	510,190	75	6,802
Hama	317,231	45	7,049
Deir-el-Zur	368,519	34	10,838
Hassaka	282,655	39	7,247
Der'a	177,466	18	9,859
Sweida	135,001	12	11,250
Total:	4,420,587	966	67,317

or 2,000,000 per year, Merely to keep pace with population growth, the medical schools should produce some 2000 new doctors annually. The total medical graduates in the region in 1960 was only 1105 (see below).

The number of physicians and medical graduates required to establish and maintain the theoretically ideal physician/population ratio can be estimated for each country (Table 7). Only Lebanon has a reasonably satisfactory quota of doctors and medical graduates by Western standards. So many additional physicians are needed by the other states that a marked increase in facilities for medical education in the region obviously must be planned. Such planning is too complex for detailed discussion here and must be individualized. Each nation will be forced by circumstances to set realistic goals for expansion of medical services and education. For example, the 10-year objective of Saudi Arabia might be to achieve a physician/population ratio of 1/6000, to establish a widespread hospital-health center network and to found a national medical school for 75 graduates per year. The wealth in oil of that nation makes this a reasonable aim provided that cultural obstacles can be overcome.

Developing countries have initially a limited capacity to support and use medical personnel. This obvious fact is mentioned lest the impression be given that the immediate provision of sufficient physicians to establish a Western physician/population ratio is considered feasible. Medical institutions, public education, and the national economy must expand to prepare the way for a substantial increase in physicians and health coverage. During this stage of social and economic development, the most striking and immediate improvement will result from control of the preventable diseases, since these are the chief causes of illness and death. Even a small contingent of health personnel can accomplish much if properly organized.

TABLE 5
RATIO OF POPULATION TO PHYSICIANS IN IRAQ, 1959 (9)

Liwas (districts)	No. inhabitants for each physician
Baghdad	1,888
Kerbela	4,617
Diala	5,786
Karkuk	6,705
Basra	6,985
Mosul	8,970
Hilla	9,306
Ramady	10,185
Arbil	12,977
Kut	15,267
Diwaniya	15,861
Salaimaniya	16,660
Amara	19,361
Nassiriya	25,314

The medical schools in the Arab Middle East.—There are ten medical schools with a total of 8370 students and 1105

TABLE 6
HOSPITAL BEDS

Country	Year	Hospitals	Beds	Population	Population per hospital bed	Hospital beds per 1,000 pop.
Syria (20)	1959	77	4,683	4,421,000	945	1.1
Iraq (9)	1959	102	9,888	6,590,000*	667	1.5
U.S.A. (2)	1959	6,845	1,613,000	177,103,000	110	9.1

* 1958 census estimate (21).

graduates in 1960. Table 8 summarizes pertinent data and permits rough comparison. As a result of larger enrollment and the recent opening of two new schools (Mosul, Iraq, and Assiut, Egypt), the total number of medical graduates in the Arab Middle East in 5–6 years will be 1500–1700 per year.

There are no medical schools in Jordan or on the Arabian peninsula. These two areas, with a combined population of 14,000,000, depend upon other countries for the training of physicians.

The significance of high enrollment in government medical schools.—The acute shortage of physicians results in strong pressure on the government medical schools to increase enrollment. All the schools in the Arab Middle East except those in Lebanon are affected. In Iraq and the United Arab Republic, the size of classes is determined more by the sense of urgency and the number of applicants than by the availability of facilities and faculty. This is not true in Sudan which plans a more gradual increase in graduates.

Where enrollment is disproportionately high (Table 8), student selection for admission is relatively indiscriminate. Unfavorable faculty/student ratios occur and result in burdensome teaching loads and limited student supervision. Necessarily, the curriculum is heavily weighted with lectures. Facilities, especially laboratories and libraries, are overtaxed. There is an inevitable tendency toward rote learning and authoritarian pedagogy.

On the other hand, the social and political pressure for increased enrollment in the government medical schools has stimulated reactions beneficial to medical education in the countries concerned. The medical faculties have responded with an unprecedented burst of planning and activity. Governments appear increasingly willing to invest in medical education. As a result, new buildings are on the drawing board or actually under construction at every national school. Faculties are being strengthened by young physicians, many of whom have had excellent training in Europe or America. This new generation of doctors is more and more in evidence and will doubtless alter the nature of medical education in the Arab countries. Western standards are being met only exceptionally at the present time in the medical schools of the Arab Middle East, but the situation is dynamic, and progress is increasingly rapid.

The duration of medical education.—The duration of formal education leading to the medical degree ranges from 17 to 20 years in the medical schools of the region (Table 9). There have been virtually no negotiations thus far to establish a basic uniformity in medical education throughout the region. At present, educators from the various countries meet periodically to study the primary and secondary school systems with a view to making them relatively compatible. These efforts have so far met with little success. It is also timely for medical educators to discuss variation in admission requirements and in

TABLE 7

ESTIMATES OF PHYSICIANS NEEDED TO ESTABLISH AND ANNUAL MEDICAL GRADUATES NEEDED TO MAINTAIN M.D./POPULATION RATIO OF 1/1000

	Iraq, 1959	Jordan, 1957	Lebanon, 1959	Saudi-Arabia, 1958	Sudan, 1960	U.A.R., Egypt, 1956	U.A.R., Syria, 1959
A. Total physicians actual*	1,428	213	1,445	203	270	7,666	966
B. Total physicians ideal (based on $\frac{\text{M.D.}}{\text{Pop.}} = \frac{1}{1000}$)	6,590	1,527	1,547	6,036	10,262	23,410	4,421
C. Additional physicians needed to reach "ideal" (B − A)	5,161	1,314	102	5,833	9,992	15,744	3,455
Medical graduates a. annual—actual—1960†	92	0	59	0	19	866	69
Medical graduates b. annual, ideal needed to maintain $\frac{\text{M.D.}}{\text{Pop.}} = \frac{1}{1000}$‡	198	46	46	181	308	702	133
Medical graduates c. additional needed annually (to maintain $\frac{\text{M.D.}}{\text{Pop.}} = \frac{1}{1000}$ (b − a)	106	46	13 (Excess)	181	289	164 (Excess)	64

* See Table 3.
† See Table 8.
‡ Based on assumption (probably too low for the Middle East) that it requires 30 medical graduates annually per 1,000 practicing physicians to maintain a constant M.D./Population ratio (15).

total years required for graduation. The differences which now exist result in gross inequality of the degrees.

Similarly, the regulations regarding licensure vary from country to country. It should be possible eventually to reach international agreement on the subject. This matter is not of direct concern to the medical schools. However, it has a definite bearing on an important objective of medical education, which is to prepare physicians for maximum mobility in the region. Whatever can be done (without introducing a stifling rigidity) to lower barriers in the Arab Middle East and to encourage the free exchange of students and health personnel will be of value.

The language of instruction.—The policy regarding language is shown in Table 9. At present, the only medical school in the world which teaches in Arabic is in Damascus. There is a trend toward making Arabic the language of instruction in the United Arab Republic, where courses in the premedical or P.C.B. year are now taught in Arabic as far as possible. There are strong cultural and political reasons for using Arabic throughout the educational system, and these may override academic and scientific considerations. Arabic has not yet an adequate medical literature for teaching purposes, and laborious translation of instructional materials is necessary. In the fast-moving scientific world of today this is a serious handicap. The importance of developing scientific Arabic is widely recognized, but the consensus is that it is wise to use a foreign language for teaching purposes until its abandonment will not affect the educational program adversely.

TABLE 8

THE MEDICAL SCHOOLS IN THE ARAB MIDDLE EAST IN 1961

School: Address, dean, year founded, ownership	Year*	University hospital beds	Teaching staff	Total enrollment	Admissions	Graduates†
IRAQ						
College of Medicine University of Baghdad, Baghdad Dean Ahmed Izzat Kayssi 1927, Government	1954-1955 1960-1961	 800	124 104	520 1,044	150 253	47 (1955) 92 (1960)
Mosul College of Medicine, University of Baghdad, Mosul 1959, Government	1960-1961	200	....	172	84	....
LEBANON						
Faculty of Medicine, American University of Beirut, Beirut Dean Joseph J. McDonald 1867, Private	1954-1955 1960-1961	 229	73 89	169 163	40 40	33 (1955) 34 (1960)
Faculté Française de Médecine et de Pharmacie de Beyrouth, Université Saint-Joseph, Beyrouth Dean Rev. Père Pierre Madet 1883, Private	1954-1955 1960-1961	 200	 67	267 236	50 53	40 (1955) 25 (1960)
SUDAN						
Faculty of Medicine, University of Khartoum, Khartoum Dean H. Butler 1924, Government	1954-1955 1960-1961	 720	25 36	110 152	30 36	14 (1955) 19 (1960)

UNITED ARAB REPUBLIC

Faculty of Medicine, Alexandria University, 8, Sharia Kenissa Elinglizia Alexandria, Egypt Dean A. R. El-Sadr 1942, Government	1954-1955 1960-1961	 1,271	106	1,250 1,335	275 360	160 (1955) 136 (1960)
Faculty of Medicine, University of Assiut, Assiut, Egypt 1960, Government	1960-1961	....	....	150	150	....
Faculty of Medicine, University of Ain Shams, Sharia El-Malika, Cairo, Egypt Dean Ahmad Ammar 1947, Government	1954-1955 1960-1961	 1,400	88 197	1,794 C. 2,050	220 C. 450	150 (1955) C. 280 (1960)
Faculty of Medicine Cairo University, Sharia Kasr-el-Aini, Cairo, Egypt Dean Mahmoud A. H. Attiah 1828, Government	1954-1955 1960-1961	 3,200	 387	2,000 2,580	500 550	250 (1955) 450 (1960)
Faculty of Medicine, Damascus University, Damascus, Syria Dean Izzat Moreiden 1919, Government	1954-1955 1960-1961	 420	62 62	359 488	65 88	56 (1955) 69 (1960)

* 1954-1955 data obtained from *World Directory of Medical Schools* (26). Remainder of data obtained by personal communication from the administrative offices of the various medical schools.

† Total graduates in 1960 = 1,105.

TABLE 9

DURATION OF MEDICAL EDUCATION IN THE MEDICAL SCHOOLS OF THE ARAB MIDDLE EAST IN 1960–1961

School	Language of instruction	Primary and secondary education (years)	Premed. (PCB) (years)	Medical school (years)*	Total (years)	Degree awarded	Additional requirements
Iraq:							
Baghdad	English	11	1	5	17	M.B. Ch.B.	18 months of military service.
Mosul	English	11	1	5	17	M.B. Ch.B.	1 year of hospital training. 4 years' compulsory govt. medical service.†
Lebanon:							
American University	English	12	3	5	20	M.D.	None
French Faculty	French	13	1	6	20‡	M.D.	None
Sudan:							
Khartoum	English	12	1	5	18	M.B. B.S.	1 additional year of hospital training required before eligible for licensure.
United Arab Republic:							
Alexandria Ain Shams Assiut Cairo Damascus	English Arabic	12	1	6	19	M.B. Ch.B.	1 additional year of hospital training required before eligible for licensure. 2 years' compulsory practice in rural hospital or community.† 2 years' military service.

* The final year is similar to a rotating internship, but the amount of responsibility for patient care varies from school to school.
† May be exempted from if chosen for advanced training in basic science or clinical field.
‡ Beginning in 1961–1962 the premedical year will be eliminated, and the P.C.B. courses will be taught during the first year of medicine. Thus the total years will be reduced to 19.

The curricula of medical schools in the Arab Middle East.—Each medical school in the region is, as it were, a metastasis from a Western system of medical education (Table 10). The Medical School of the American University of Beirut (Fig. 1) follows the American plan of medical education. Although it began in 1866 as a mission school known as the Syrian Protestant College (Presbyterian and Congregational Missions), it is now directed by a Board of Trustees similar to that of a private university in the United States. The name was changed in 1920 to American University of Beirut. It operates under a charter from the Board of Regents of the University of the State of New York. The medical school is a full member of the Association of American Medical Colleges. Thus, it meets the same requirements for accreditation as an American medical school, and its graduates are accepted by the licensing boards in virtually all states in the United States as well as in the United Kingdom (11).

The Faculté Française de Médecine et de Pharmacie of Saint Joseph University in Beirut is the only other private medical school in the Arab Middle East. It is administered by the Catholic Jesuit order but is under the technical supervision of a Higher Council of professors and deans of the Universities of Paris and Lyon. The curriculum is essentially the same as that in a French medical school. The degree awarded is the French *diplômea d'Etat* (State diploma) of *Docteur en Médecine* (Doctor of Medicine) which is equivalent to that awarded in France and allows the holder to practice in Lebanon as well as in France and in French territories. The French curriculum significantly differs from the American and British approach in the emphasis placed on clinical experience throughout the course. Hospital work begins in the first year of medicine, and responsibility for clinical service increases year by year.

The other medical schools in the Arab Middle East are operated by national gov-

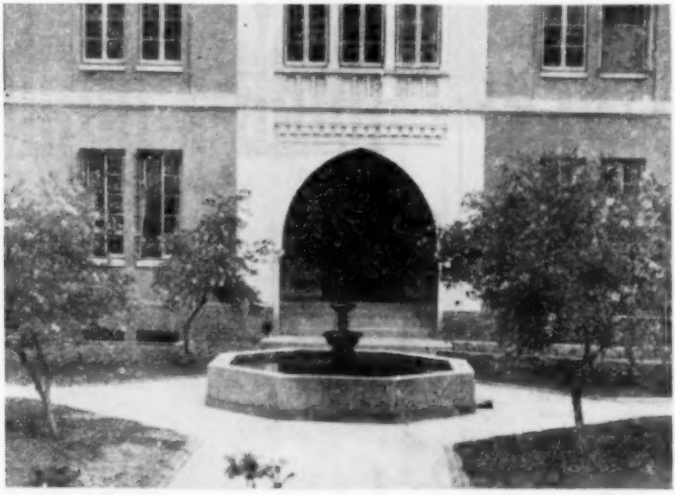

FIG. 1.—The medical sciences building of the American University of Beirut.

TABLE 10

THE CURRICULA OF THE MEDICAL SCHOOLS IN THE ARAB MIDDLE EAST

	Iraq (Baghdad Mosul)	Lebanon (American Univ. of Beirut)	Lebanon (Faculté Francaise de Médecine)	Sudan (Khartoum)	United Arab Republic*
	1 Year	3 Years	1 Year	1 Year	1 Year
Premed.	Physics Chemistry Biology	Physics Chemistry Biology Math Psychology Sociology Language	Physics Chemistry Biology	Physics Chemistry Botany Zoology	Physics Chemistry Biology Botany Humanities Language
	2 Years		2 Years		Intermediate period—2 years
Medicine, 1st year	Anatomy Biochemistry Physiology Histology Embryology	Anatomy Biochemistry Physiology Histology Psychology Public health Preventive medicine Biostatistics	Anatomy Biochemistry Physiology Histology Embryology Physics Clinical experience in medicine and surgery	Anatomy Biochemistry Physiology Histology Botany Chemistry Entomology Protozoology Zoology	Anatomy Biochemistry Physiology Histology Embryology Psychology Preventive and social med. Biostatistics Introduction to medicine and surg.
Medicine, 2d year		Neurology Neuroanatomy Pathology Clinical pathology Microbiology Parasitology Pharmacology Introduction to medicine Medical diagnosis Clinical correlation		Anatomy Neuroanatomy Biochemistry Physiology Histology Embryology Pharmacology Public health Introduction to medicine	
					Clinical period Part I—1 yr.
Medicine, 3d year	Medicine Surgery and surgical specialties	Medicine Pediatrics Obst. and gyn.	Pathology Bacteriology Parasitology	Medicine Surgery Dental Surg.	Medicine Pathology Microbiology

	Pathology Bacteriology Parasitology Pharmacology	E.E.N.T. Clinical conf. Lecture series in general medicine	Obstetrics Experimental med. Clinical exper. in med. and surg. obst., pediatrics, dermatology, syphilology, psychiatry, neurology, and specialties extend through 3rd, 4th and 5th years	Pathology Bacteriology Parasitology Pharmacology Therapeutics Anesthesia Entomology Nursing	Parasitology Pharmacy
Medicine, 4th year	Medicine Surgery and surgical specialties Pediatrics Obst. and gyn. E.E.N.T. Dermatology and venereal dis. Infectious dis. Psychiatry Forensic medicine Ethics Public health	Medicine Surgery and surgical specialties Pediatrics E.E.N.T. Dermatology and syphilology Psychiatry Anesthesia Forensic medicine Ethics Clinical conference	Medico-surgical anatomy Practical medicine Clinical experience (see above)	Medicine Surgery Pediatrics Obstetrics E.E.N.T. Infectious diseases Pathology Bacteriology Parasitology Forensic med. Public health	Clinical period Part II—2 yrs. Medicine Surgery Pediatrics Obst. and gyn. E.E.N.T. Dermatology and venereal dis. Applied pharmacology and physiology Surgical anatomy Surgical Path. Clinical Biol. Psychology Anesthesia X-ray Physical therapeutics Preventive med. Social medicine Forensic med. Industrial med. Ethics
Medicine, 5th year	Rotating internship plus lectures	Rotating internship plus field training in public health		Medicine surgery Obst. and gyn. Psychiatry Ophthalmology Therapeutics Dermatology Venereal dis.	
Medicine, 6th yr.	M.B. Ch.B.	M.D.	Rotating internship	M.B. B.S.	Rotating internship
			M.D.		M.B. Ch.B.

* The five medical schools in the United Arab Republic (Alexandria, Ain Shams, Assiut, Cairo, and Damascus) are coordinating their curricula in accordance with government regulations (7).

ernments in Iraq (Figs. 2, 3), Sudan (Figs. 4, 5) and the United Arab Republic (Figs. 6–8). These countries were previously under British influence, and therefore their medical curricula follow the British tradition. The course is characterized by didactic teaching, emphasis on anatomy and its related subjects during the first 2 years, and by climactic qualifying examinations at 2- to 3-year intervals. External examiners are regularly invited to participate in these tests which the Austrians have aptly termed *rigorosa*. This system is

FIG. 2.—Entrance to Baghdad University Medical School, Iraq.

FIG. 3.—Pavilions of the Baghdad University Hospital, Iraq.

especially suitable when the size of classes is out of proportion to the number of faculty.

Adaptation of curricula to regional needs.—As noted above, the medical curricula of the region differ little in outline from Western prototypes. Much effort is being devoted to improvement along orthodox lines, with strengthening of science and clinical departments. This is timely and important. However, there has thus far been relatively little experimentation with methods to prepare physicians to cope more effectively with

FIG. 4.—Entrance to the Kitchener School of Medicine, Khartoum University, Sudan.

FIG. 5.—Khartoum University Hospital, Sudan.

the problems of public health and disease prevention. In view of prevailing health conditions, it would seem logical for each medical school to give major attention to its role in improving them.

The concepts and techniques of public health and preventive medicine are presented didactically in one way or another in all the curricula. In addition, students are taken on the customary field trips and tours. However, no faculty is involved deeply in providing and teaching the comprehensive type of medical care which has community health as its primary objective. Medical education in the region has in general remained aloof from basic health issues and has not in an exceptional manner fostered either the motivation or the programs necessary to cope with them. This is exemplified by the fact that there are only two schools of public health in the Arab Middle East—The School of Public Health of the American University of Beirut (opened 1954) and the Higher Institute of Public Health in Alexandria (opened 1956), the latter not connected with a medical school or university.

FIG. 6.—Entrance to Damascus University and Medical School, Syria.

FIG. 7.—Damascus University Hospital, Syria.

The reasons for this apparent lack of emphasis on the social orientation and goals of medicine are numerous. It is of considerable significance that the leading members of most clinical departments have been trained exclusively in curative medicine and rely upon its practice for livelihood. This influence is reinforced by the hospital-centered curriculum of classical medical education and by the overwhelming demand for treatment of overt disease. Furthermore, the tradition of public service is not yet well established in Middle Eastern culture.

Recent social and economic changes provide the medical schools with a better opportunity to approach general health problems. It would be worth while for each faculty to participate more actively in the development of urban and rural health programs. Experimentation with programs of this type is a proper function of medical schools in underdeveloped areas. Student experience under faculty supervision in district hospitals and rural health centers has proved valuable in Puerto Rico, Colombia, and India (10, 19). Such projects designed to teach the appropriate blending of curative, preventive, and public health measures should be studied for their applicability in the Middle East. A model system of health units extending to the periphery of the community is as logical a part of the medical school as the university hospital.

Medical schools in the Arab Middle East, as elsewhere, are engrossed in the production of doctors. Questions regarding their function in society are traditionally left to medical societies, government agencies, and lay organizations. The paucity of medical personnel and resources in developing countries make it essential that physicians be used as effectively as possible. Means of accomplishing this while safeguarding personal freedom, professional satisfaction, and the public interest are also a proper concern of medical education. Unless this principle is accepted and judiciously followed, the medical faculty is hampered in adapting the curriculum to local conditions.

Research and basic science departments.—Medical education has been almost exclusively clinical in its orientation and will remain so for a long time in some of the schools. As a result, a great deal of the so-called research has consisted in the past of case reports and

FIG. 8.—Kasr-el-Aini Hospital. The University Hospital of Cairo University Medical School, Egypt.

the like. However, there is growing emphasis on true research as a natural ally of the teaching and service programs. This is noticeably affecting both clinical and basic science departments. The requirement of "original research" as a prerequisite for a higher degree and academic advancement is also a strong stimulus in Iraq, Sudan, and the United Arab Republic (see below).

The basic science departments throughout the region are in the need of support and development. Almost without exception they are grossly understaffed and excessively burdened with teaching. One must admire their persistent research efforts in spite of odds which would discourage most investigators. Fortunately, the importance to both teaching and research (of strengthening the basic sciences) as rapidly as funds and personnel permit is nowhere questioned. International agencies also are assisting generously with training and research grants and visiting professorships.

It is encouraging to note the increased collaboration between basic science and clinical departments in many of the schools. This coincides with the recent addition to the clinical staff of well-trained young physicians with graduate experience in research. Research units are being set up in connection with the teaching wards, particularly at Kasr-el-Aini Hospital (Cairo University), Alexandria University Hospital, and the American University Hospital in Beirut. These developments presage an improvement in the quality of medical education and are examples of the change and progress apparent in all the medical schools.

Strangely enough, funds for research do not seem to be a limiting factor. Foundations and international agencies are willing to invest in competent men with promising ideas. The schools themselves all have research funds for internal use and, in Iraq and in the United Arab Republic, a national research council has been formed to conceive and coordinate research projects which are "in the national interest." For example, bilharzial research in Egypt is intensively encouraged and well supported by the government research agency.

Graduate training. — Graduate training in the medical specialties is as important in the Middle East as in the West and should be given high priority. High-quality medical care will come to the region only when there are enough physicians with 3-5 years of sound graduate training to provide for differentiated medical services. There is little place now, and there will be less in the future for the generalist who does everything from child health to major surgery.

Specialization is well under way in the medical profession of the Middle East, and the trend will doubtless continue. Modified group practice based on a regional hospital and health center complex makes possible a coordinated attack on health problems. The current programs sending inexperienced young graduates to the rural areas are strictly holding operations until small but properly trained teams can take their places. This is no recommendation for narrow specialism but for the division of labor and the graduate training which modern medicine demands.

Graduate training in the Arab Middle East is now virtually confined to the university hospitals and a few affiliated institutions. Thus, there is a marked lack of facilities for graduate education. This is partly compensated for by opportunities in Britain, France, the United States and other countries. However the deficiency will be serious until programs are developed within the region.

The American residency system has proved to be an effective way to train clinicians, and the university setting is not required. Residency programs could be started in many of the general hospitals of the region within a few years if this were an agreed policy. The standards of those hospitals would be raised and the supply of well trained physicians augmented.

Medical faculties are in the best position to see the problems of graduate training in perspective. Consideration should be given to fostering the development of residency programs in selected hospitals unless a more practical solution can be found.

Full-time faculty.—Interest in the development of strong full-time clinical departments is increasing. At present they exist only at Khartoum and the American University of Beirut. Most of the staff of the basic science departments in the region are full-time. However, application of the full-time concept to the clinical fields has lagged for economic reasons and because conviction of its value has not been widespread. Now that increasing numbers of well qualified young faculty members are favorably disposed to the full-time idea (usually as a result of their graduate training abroad), more serious consideration is being given to the establishment of truly full-time leadership in clinical departments. This step, which is essential to attainment of highest standards and to adaptation of the curricula to local needs, would be taken promptly in many of the schools if it were possible to finance the full-time faculty.

The problem of financing is difficult to solve, especially in the national schools of Iraq and United Arab Republic where full-time salaries for professorial posts are too low to attract experienced clinicians. This is illustrated by the salary scale for academic personnel in the United Arab Republic, Egyptian Province, shown in Table 11.

When one realizes that the cost of living for a physician in the Middle East is not far below that in the West, it is easy to understand why virtually all professors and assistant professors of clinical departments elect part-time status in order to augment income from private practice. It should be pointed out that a nucleus of full-time members is assured in each clinical department in the United Arab Republic by a regulation which denies private practice privileges to all demonstrators and to those instructors with less than 2 years' service. Nevertheless, the over-all effect of the financial situation is to retard the creation of clinical departments in which there is the most effective balance of part-time and full-time staff.

At present, there is only one dependable source of the additional funds needed to build adequate full-time clinical staffs in the national medical schools of the region. That source is private practice. It is unlikely that either government salaries or the donations of philanthropic foundations and international agencies can replace private practice income. This being the case, the medical schools should give special attention to the development of their private practice facilities and to the formulation of equitable plans for using private practice income to support the academic program. This is widely and successfully done in the United States. It is especially appropriate in the Middle East, where there is insistent demand by the upper strata of society for the services of university physicians who are frequently the only ones available in certain clinical fields. The teaching hospitals in Khartoum, Damascus, and Beirut now have excellent private practice facilities.

TABLE 11

SALARIES OF FULL-TIME STAFF OF MEDICAL SCHOOLS IN THE UNITED ARAB REPUBLIC, EGYPTIAN PROVINCE (6)

Full-time position*	Basic salary/year		In lieu of outside work	Total salary/year Increments
Demonstrator with M.B., Ch.B.	$ 520-690	....	$ 520-690	$85 per year until salary reaches $1,205
Demonstrator with M.D.	1,035	....	1,035	$105 every 2 years until salary reaches $1,380
Instructor	1,380-2,240	$ 520	1,900-2,760	$140 every 2 years
Assistant professor	2,240-2,100	690	2,930-3,790	$210 every 2 years
Professor	2,755-4,305	1,035	3,790-5,340	$280 every 2 years
Dean	3,615-5,165	1,035	4,650-6,200	$280 every 2 years
Vice-president of university	5,160	....	5,160	....
President of university	6,315	....	6,315	....

Exchange rate: 1 Egyptian pound = $2.87.

*Part-time instructors, assistant professors, and professors are paid $860–1,720/year with no increments. All demonstrators and those instructors with less than 2 years' service in that position are required to be on full-time status. Instructors with more than 2 years' service in grade, assistant professors and professors may apply for part-time status which is granted at the discretion of the university. Practically all clinicians request part-time status as soon as eligible.

The educational and financial contributions which private practice can make to the medical schools of the region is great and is not being fully realized. If administered properly, private medicine improves the public sector of medical service and adds an important dimension to the teaching of medical care.

Equivalence of degrees and credentials.—As previously noted, the medical schools in Iraq, Sudan, and the United Arab Republic follow British academic precedents. The degree of bachelor of medicine and surgery (M.B.B.S. or M.B.Ch.B.) is awarded on graduation and is analogous to the M.D. degree of American and French schools. Specialty diplomas and "higher" degrees must be earned by further study in order to be eligible for academic advancement in the British-type programs.

A specialty diploma in a clinical field in the United Arab Republic requires (*a*) a minimum of 1 year of graduate training in the university hospital and (*b*) the successful completion of a diploma examination. The medical schools of the United Arab Republic may award a total of 22 different diplomas in clinical specialties and ten in the medical sciences. The diploma curriculum in a clinical specialty resembles a combination of first-year residency training and the formal course-work for a Master of Science (M.S.) degree in an American university.

The degrees of Doctor of Medicine (M.D.) and Master of Surgery (M.S.) are "higher" degrees or qualifications according to the nomenclature used in Iraq, Sudan, and U.A.R. They are somewhat analogous to a Ph.D. acquired after obtaining an M.D. in the American system. In order to receive the Doctor of

Medicine or Master of Surgery degree in the United Arab Republic, the candidate must (*a*) hold a diploma in a field related to his specialty; (*b*) spend a minimum of 3 years in a university hospital (there are several alternatives to this requirement); (*c*) submit an acceptable thesis on original research; and (*d*) pass oral and written examinations. Fellowship in one of the British Royal Colleges such as the Royal College of Surgeons is considered the equivalent of a higher degree. Certification by one of the American Boards or fellowship in one of the American clinical colleges is not accepted as the equivalent of a higher degree.

The fact that a higher degree (or its equivalent) is required for academic advancement in Iraq, Sudan, and U.A.R. should not be overlooked by physicians from these countries taking graduate training in the United States. There are now in the Middle East many physicians with American Board certification or with American residency or research training. Some of these physicians are acceptable for medical school appointment by American standards. Nevertheless, their applications to medical schools in their own countries may be rejected or shelved because they do not have higher university degrees.

All the medical schools in the region have committees which review unorthodox qualifications and decide the equivalence of degrees and credentials. Policy regarding the equivalence of American residency training is not established in Iraq, Sudan, and the United Arab Republic. The tendency is to question its value as compared to programs leading to university diploma and degrees. Clarification of this matter is quite important because of the large contingent of Middle Eastern physicians (1714 in 1959-60 [12]) now receiving graduate training in the United States. Furthermore, the enormous educational potential of the American residency system is seriously diminished as far as the medical schools of the Arab Middle East are concerned if certification by American Boards is not accorded academic recognition.

Information regarding American residency training and the specialty Boards is readily available (1, 5). However, their philosophy and academic "equivalence" is not clear to most of the medical educators in the region. Various officials of the medical schools have expressed interest in discussing these matters with a representative of an appropriate American committee or council. Mutual understanding and benefit would doubtless result from such discussions. They would probably also be welcomed by the Cultural Affairs Officers of American Embassies, since these officials are sometimes hard put to explain the implications of American graduate medical education.

The status of American medical credentials abroad will be of concern to more foreign physicians than ever now that all the Boards will accept foreign graduates under certain conditions. The problem is not confined to the Middle East. Dean Melvin A. Casberg of the Christian Medical College in Vellore has pointed out that the medical schools in India are also reluctant to recognize American graduate training (4). In view of the fact that the issue is of growing significance, it is suggested that it deserves study by a top-level group such as the Committee on International Relations in Medical Education of the Association of American Medical Colleges or the Educational Council for Foreign Medical Graduates.

CONCLUSIONS

1. Health conditions in the Arab Middle East are generally poor, and there is an over-all shortage and maldistribu-

tion of doctors. It is estimated that the physician/population ratio for the region is 1/4000. The medical needs are most marked in the Arabian peninsula and the Sudan, where the physician/population ratios are 1/30,000 and 1/38,000.

2. There are ten medical schools in the area, with a total of 1105 medical graduates in 1960. Population growth alone requires about 2000 doctors annually. This indicates the importance of increasing the facilities for medical education as rapidly as possible.

3. The various medical schools differ considerably in quality and duration of medical education. Factors responsible for this are discussed. It is suggested that standards should be raised and more or less equalized throughout the Arab Middle East. The formation of an Association of Middle Eastern Medical Colleges would serve this and many other useful purposes.

4. The curricula of the medical schools of the Arab Middle East have not yet been especially adapted to prepare physicians to cope with regional health problems. Experimentation with teaching methods to accomplish this is in order.

5. Basic science departments in the region have full-time leadership but, in general, clinical departments do not. The reasons for this are mentioned. The importance of developing a more effective balance of part-time and full-time staff in the clinical fields is pointed out.

6. Graduate training facilities are extremely limited in the region. Inauguration of residency-type programs is the best solution.

7. American residency training and American Board certification are poorly understood in the Arab Middle East. As a result, graduate training in the United States may prove unacceptable to the medical schools in Iraq, Sudan, and the United Arab Republic, which require higher university degrees (or their equivalent) for academic advancement. When more medical educators in the Middle East have visited American medical schools and teaching hospitals, the lack of emphasis on degrees in the American system will be better appreciated. It is suggested that one of the committees or agencies concerned with graduate education for foreign physicians might profitably study the problem of acceptance abroad of American training and credentials.

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Medical Education and the Association of American Medical Colleges 1959-1961

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SUMMARIO

Le disveloppamento e stato actual de education medical in le Statos Unite de America es recensite e le rolo jacate in su evolution per le Association de Universitates Medical American es evalutate. Su plus forte anxietate es le necessitate de expansion in le systema de maestramento medical de iste pais, in le qual le establimento de nove scholas debe esser un factor essential. On vide progresso in iste respecto in le facto que depost 1959, 3 nove scholas medical ha graduate classes, e 2 alteres ha comenciate de operar e son in le processo de expander. Le Committee Liaison super Education Medical del Association, in plus de inspectar le scholas existente e novemente disveloppate in le Statos Unite e Canada, provide consultation e aviso a plus de un dozena de gruppos e communitates que considere seriosemente al presente le establimento de nove scholas medical. De plus, pro facer possibile modernisation de scholas existente como anque le construction de noves, le Association ha proponite que le Congresso provide fundos appariate pro un periodo de 10 annos. On face observar, nonobstante, que in despecto de studios minutiose complite per le Association, datos financiari exacte re le costo de education medical son ancora "dolorosemente incomplete." Le qual pote esser determinate super le base de information ab 26 scholas particular e 16 scholas public es que le patrono de financiamento de scholas medical ha subite cambios significative; que le costos cresce constantemente, e que education medical continua a reciper un appoio grandemente inadequate. Recerca appoiate per concessiones, al altere latere, ha crescite quasi duo vices si rapidemente como disbursamentos total pro education medical. Le impacto del costo crescente de education medical super le numero de studiantes se vide in le facto que pro le tertie anno consecutive le numero de sollicitatores ha discrescite. Ergo, nove fontes de appoio financiari per bursa e fundos de presto son perquirite vigorosemente ab fundationes, le profession medical, e ab le governamentos federal e de stato. Un reporto del disveloppamento de nove programmas e conceptos in education e recerca medical, e in maestramento post-graduate, patronisate per le Association e altere organisationes monstra progresso marcate, como anque le activitates del Division de Education Medical International del Association. Altere contribution importante se vide in le publicationes del Association que forni information valutabile super omne aspectos de education medical.

The development and present status of medical education in the United States and the role played by the Association of American Medical Colleges in its evolution were subjects of papers included in the first International Issue of this Journal 2 years ago (10, 39). A progress report at this time is merited by the rapid changes occurring in medical education and the increasing responsibilities for leadership and service that the Association is assuming.

The Association has long been concerned with the need for expansion in the nation's system of medical education (34). This need has been well documented in recent reports by advisory committees of consultants to the Department of Health, Education and Welfare and the United States Senate in the Bayne-Jones (3), Bane (2), and Jones reports (18). They have provided the

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following dimensions for the problem: by 1975, 3,500 more medical students must be graduated each year to maintain the nations present ratio of physicians to population; to compensate for attrition between admission and graduation approximately 4,000 first-year places must be provided by 1971.

A recent survey by the Liaison Committee of the Executive Committee of the Association of American Medical Colleges and the Council on Medical Education and Hospitals of the American Medical Association (37) discloses that 1,700 first-year places can be created by modernization and expansion of existing schools. The remaining 2,300 places must come from new medical schools. Suggestions have been made that the need be met in part by new 2-year schools of basic science whose students could transfer to the junior classes of existing or newly created 4-year schools for completion of their educational program. New schools will present major problems in financing, construction of extensive and expensive facilities, and the recruitment and training of an adequate faculty (25).

Since 1959 three new medical schools have graduated classes: Albert Einstein College of Yeshiva University of New York City, June, 1959; Seton Hall College of Medicine and Dentistry, Jersey City, New Jersey, June, 1960; and the University of Florida College of Medicine, Gainesville, June, 1960. The University of Kentucky School of Medicine, Louisville, admitted 40 students to its first class in 1960 and will increase to 75 students annually when fully developed. The University of West Virginia (23), formerly a 2-year school of basic sciences, has expanded to a 4-year school and will graduate its first class in June, 1962. In 1957–58 there were 8,302 admissions to medical schools, and in 1961–62 there were 8,512 (15).

The Liaison Committee on Medical Education, in addition to surveying existing and newly developing medical schools in the United States and Canada is providing consultation to groups contemplating the establishment of new schools (17). Advisory visits are undertaken after both Councils represented by the Liaison Committee receive invitations from responsible authorities of educational institutions or hospitals and the state and local medical societies concerned. Attention is directed to several factors which must be considered in establishing either a 2-year basic medical science program or a full 4-year program. First, a suitable environment must be provided by a strong university or liberal arts college. Second, the new medical school must have the enthusiastic support of all individuals, agencies, and professional groups with a direct interest in the development and maintenance of the venture. Third, realistic estimates of capital expenditures and operating funds must be developed and presented to proper authorities. Sound sources of funds for the development and maintenance of the school must be assured. Fourth, a pool of well prepared and able students, both within and without the state, must be available. Fifth, an adequate source of patients both for ambulatory and hospital care, and with balanced distribution as to age and sex, socioeconomic status, and disease entities must be available.

A dozen or more groups or communities are currently seriously considering the establishment of new medical schools. During the past year the Kellogg Foundation has made grants of approximately $1,000,000 each to the University of New Mexico in Albuquerque and the University of Connecticut in Hartford to aid in the establishment

of schools of basic sciences. These two schools will provide the first 2 years of the medical curriculum with transfer of the students to 4-year medical schools for their junior and senior years.

Financial requirements for the planning and establishing of new schools have been estimated by Willard (38). For a class of approximately 75 students the cost of building a basic science building was estimated at 4–6 million dollars. Geographic variation in costs of labor and materials and individual differences on space requirements and essential facilities account for the range. The outlay for hospital and out-patient clinical facilities would approximate fifteen million dollars. Operating expenses were set at about $600,000–$700,000 for a 2-year school of basic science and 2½ million dollars for a fully established 4-year medical school. A 400- to 500-bed university hospital with 50–100,000 out-patient visits a year was estimated to require an operating budget of approximately 5 million dollars. This cost would be offset in part by paying patients, third-party payments, and by community and state welfare financing of the cost of the medically indigent.

The Association has established a committee for study of the planning, design, and construction of medical schools. A guide developed by the Committee on the Planning of Medical Education Facilities (29) will be published under the joint sponsorship of the Association of American Medical Colleges, the Council on Medical Education and Hospitals of the American Medical Association, and the Public Health Service. The guide will provide models for the staffing patterns and facilities required for medical schools with entering classes of 48 and 96 students. In addition, a file of information, including plans of outstanding institutions, will be developed.

To make possible modernization and expansion of existing schools and the construction of new schools the Association of American Medical Colleges has proposed (27) that Congress provide matching funds for a 10-year period. It recommends that 50 million dollars a year for 3 years be provided for grants to permit the full modernization, expansion, or replacement of the educational, research, and library facilities of existing schools of medicine. If an increase of 5 per cent or more is made for the enrollment of first-year medical students, the federal matching should be 3 dollars for 1; if there is less than a 5 per cent increase in first-year places, the federal matching should be 3 dollars for 2.

In addition 50 million dollars a year for 3 years is suggested for grants to existing schools of medicine for the modernization and expansion of teaching hospitals and clinics that are their primary base for clinical teaching and research. The matching formula for such grants to be one federal for 1 local dollar.

For the first year an additional 50 million dollars is recommended for grants for the construction of new schools, including research facilities and teaching hospitals and clinics, federal funds to be provided upon a three-to-one basis. To provide support for planning the Association proposes that $300,000 per year be appropriated for grants up to $50,000 to an academic institution that wishes to study the feasibility of establishing a new school.

Accurate financial data on the cost of medical education are still woefully incomplete. The Division of Operational Studies of the Association of American Medical Colleges supported by a 5-year grant awarded by the Kellogg Founda-

tion has undertaken a comprehensive study of the cost of financing medical education. Procedures and methods have been developed by A. J. Carroll (4, 5, 6) of State University of New York, Syracuse, to facilitate a self-analysis of program cost by individual schools. Schools using the system can determine the precise cost of educating, respectively: medical students, interns, residents, graduate students, nurses, etc., and proportionate cost of research activities.

Darley (11) has documented trends in financing medical education from data for 1941 and 1948 supplied by the Surgeon General's Committee on Medical School Grants and Finances (1951) (28) for 1958–59 from an A.M.A.-A.A.M.C. joint questionnaire (37). Usable and comparable information obtained from 26 private and sixteen public schools makes it apparent that the pattern of medical school financing has been changing. For private schools, endowment is still the most important source of income, but it is dropping significantly as a percentage of the total. Appropriations continue to provide the largest single source of funds for state schools. Endowment income in public schools, although never great, has moved from fourth to ninth rank in relative importance. Tuition and fees in private schools still rank second, but in public schools this income has dropped significantly as a percentage of the total.

Nonfederal gifts and grants remain in fourth place in both 1941 and 1959 for the private schools but dropped from third to fifth place for the public schools. Federal grants for teaching and training, nonexistent before 1948, are in second place as a source of support for public schools, and fifth place for the private schools. Teaching expenses paid from medical service funds have decreased in both private and public schools. Payments made by hospitals and clinics as a source of medical school income have increased in private and public schools from sixth to third place.

The study reveals that total expenditures for medical education, excluding costs of construction and the operation of hospitals and clinics, adjusted to the 1947–49 purchasing power of the U.S. dollar, have increased as follows: 1925, $16.8 million; 1941, $49.3 million; 1948, $68.6 million; 1957, $199.3 million and 1959, $256.2 million, respectively (20). Impressive as these figures are, they represent only 0.4 per cent of the amount of money spent for medical care in 1925 and only 1.3 per cent in 1959. Medical education, the essential element in medical care for the country, continues to receive grossly inadequate support.

Grant-supported research has increased almost twice as fast as total expenditures for medical education for the same period. Funds designated for sponsored research were negligible between 1925 and 1948. Between 1948 and 1959 these monies increased by 609 per cent, and they probably will soon make up over 50 per cent of the total expenditures of medical schools (13).

The Association has given serious attention to the decreasing number of medical school applicants. This decline is occurring in the face of increasing enrollments and graduates from colleges (24). Medicine is continuing to encounter intense competition from other fields for students (2, 7). Other professions, academic careers, opportunities in business administration, new fields arising out of advances in science and technology, are all competing with and demanding their share of talented students. Hutchins and Gee (15) in the Division of Basic Research

of the Association of American Medical Colleges, present data showing that the aggregate increase in graduate level enrollments in all the other fields over the last 6 years has been 9 times the percentage increase in medical school enrollments for the same period. Over the years since 1801 there has been a slow and consistent decline in the percentage of college graduates entering the practice of medicine (from 28 per cent in 1801–1820 to 2 per cent in 1951–1955).

For the third consecutive year the number of individuals applying to United States Medical schools has decreased (15). In 1956–57 there were 15,917 applicants, and 14,952 in 1959–60—a 6 per cent decrease. The number of accepted applicants increased in the same period from 8,263 to 8,512. Although selections had to be made from a smaller pool of applicants, the Medical College Admissions Tests results suggest that there has been no significant drop during this period in the quality of students accepted (19).

The direct educational costs and years of preparation certainly influence selection of medicine as a career. Tuition fees continue to increase and range from $592 to $1,500 for privately owned schools, and $360 to $1,500 for nonresidents in publicly owned schools (37). Studies show (14) that the average cost of 4 years of medical school to the students in the 1959 graduating class was $11,642.

Comparisons reveal that the average medical student has to pay more than twice as much tuition as the average graduate student and receives one-fourth as much stipend income (if he receives such income) (1). Thus there is an 8:1 ratio of income and expense working to persuade the college undergraduate to enter graduate school rather than medical school. Additional financial burdens of the internship and residency training and loss of income during the years of preparation for medicine place it at a distinct disadvantage relative to graduate work in the physical, biological, and behavorial sciences.

New sources of financial support through scholarship and loan funds are being vigorously sought from philanthropic foundations, the medical profession, and the federal and state governments to prevent economic status from being a barrier to medical education. To help meet the need the Avalon Foundation has made grants of $16,000 to each 4-year medical school to be added to their scholarship fund. The American Medical Association is sponsoring an honors scholarship program in which 250 students are to be selected in their last year before entering medical school and 50 of these awarded $1,000 annually for 4 years on the basis of financial need. The A.M.A. has also agreed to act as a co-signer for loans obtained by medical students from their local banks. The membership of the Association of American Medical Colleges has proposed (27) that the federal government provide nonrefundable fellowships available for students during all 4 years of medical school. The scholarships would allow the recipient to attend the school of his choice. The plan calls for a lump sum grant to each medical school on the basis of $500 per student, to be administered by each school in accordance with its own scholarship rules, with $2,500 per student the maximum fellowship from federal funds allowed in a single school year.

An increase in recruitment activities has been sponsored by the American Medical Association in conjunction with the Association of American Medical Colleges. Material, including motion pictures, handbooks, speeches,

exhibits and pamphlets has been developed for high school, colleges, and communities in an effort to increase the interest of young people in medicine by presenting the wide spectrum of careers available and the challenges and satisfactions which come to the physician (26).

Much of the information about the medical schools and medical students has been obtained by the Division of Operational Studies. The collection and analysis of detailed information on facilities, faculties, financing, and students being made by the Division is essential for long-range plans and proposals for improvement of medical education. Information arising from studies is being made available promptly by publications in this Journal and through datagrams. These graphic summaries of preliminary data range in subject matter from "construction needs," to "financial aid to medical students"; from "patterns of medical school employment," to "comparison of full-time versus part-time staffing patterns in basic science and clinical departments."

The Division has compiled the first comprehensive registry of medical school faculty members. Information on rank, specialty, full-time or part-time status, earned degrees, and current military status is available on 32,000 registrants. The listings will be kept current by corrections made biannually by each medical school.

The development of new programs and concepts in medical education continue. Northwestern (9) and Boston Universities inaugurate integrated 6-year programs in medical education with the 1961–62 academic year. Carefully selected students entering on graduation from high school will spend the first 2 years in the liberal arts college and 4 years in medical school. At Northwestern, newly designed courses will take advantage of the superior high school preparation of these students and present a better coordinated preparation in the physical and biological sciences. The humanities and arts will continue into the medical school program. The programs are flexible and permit the students to spend additional time in the liberal arts college and to alter their goals and prepare themselves for other careers.

Johns Hopkins has accumulated 2 years of experience with their new plan of medical education. Students are admitted after 2 years of college into a 5-year program which interdigitates courses traditionally given in premedical preparation with those of medical school. The quality of students applying for entrance and the character of their performance in the course have been excellent. A similar plan which combines the last year of college and the first year of medical school in a 2-year sequence has been offered for several years at the University of Vermont. Stanford University Medical School (35) has finished the second year of their new 5-year program in medical education.

Honors programs permit outstanding students at the University of Kansas and New York University Medical Schools to deviate from the usual curriculum for special courses, seminars, tutorials, and research experience. The interest of students in fellowships with opportunities for research during summer or elective periods in the curriculum has increased sharply in most medical schools.

Multidiscipline laboratories for the basic medical sciences to foster integrated and correlated teaching have been built recently at Stanford University and the University of Southern California. The specially designed lab-

oratories accommodate sixteen students in each unit and provide a study space and sitting and standing work bench area for each student. All the laboratory work of the basic sciences except gross anatomical dissection can be carried out in the single laboratory. Common special equipment rooms are provided for each 32 students (two units). The multidiscipline unit provides some isolation of the work area and reduction in the distractions of traditional large laboratories. Many advantages of individual rooms can be provided while retaining the possibility for a single faculty member to supervise a group of students. The "home base" for the student gives a more definite place of identification with the medical school.

Medical schools continue to critically evaluate and make changes for improving the educational process. Divisions of Research in Medical Education have been established at Western Reserve University, the Medical College of Virginia, and the University of Illinois. These groups have devoted themselves to comprehensive studies on the educational programs at the institutions. Pedagogical studies (21) started as a joint study on teaching methods in 1956 by the Schools of Medicine and Education at the University of Buffalo, developed into a series of seminars and workshops on the teaching-learning process; the nature of the medical student; the background of higher education and particularly medical education; evaluation of the outcome of teaching and learning; the materials and methods of instruction. The undertaking grew into a summer institute, sponsored jointly by the University of Buffalo and the Association of American Medical Colleges, held in June, 1958, and 1959 (22) and subsequently an Institute on Medical Teaching offered annually since 1960 in Chicago. The goal of the Institute is to create in the participants "a greater knowledge of the basic principles of education and that their attention to these will allow the teacher to create an environment conductive to more efficient and perhaps more rapid student learning."

The Teaching Institutes which began in 1953 have stimulated medical faculties to devote their attention to medical education. The 1958 (30) and 1959 (31) Institutes were devoted to the topic of clinical teaching and the interrelationships between the hospital, medical service, graduate education, and undergraduate medical education. The 1960 Institute was devoted to changes in medical care patterns and their impact and implications for medical education (32). The proceedings of the Institutes have become valuable source books of information about a variety of aspects of medical education.

The Division of Research continues to study the applicants to medical school and provide information to admissions committees. A longitudinal study of all members of the classes entering 28 medical schools in 1956 has continued into their internship year. This group has been carefully followed throughout their medical school career with psychological tests, peer evaluations, and questionnaires (16, 34). Attempts will be made to relate the results of the study with student performance in medical school, career choice, and their subsequent professional activities. The influence of the particular medical school on its student attitudes, value systems, and interest will be evaluated.

For some years the Association has had a committee on International Relations, but since activities, interests, and obligations in the international aspects

of medical education have increased, the Executive Council endorsed the creation of a Division of International Medical Education. A 5-year grant of over $250,000 by the Rockefeller Foundation will support this new Division.

The objectives of the Division will be to promote interest in international cooperation in medical education; assist various agencies in the recruitment of American faculty for service abroad on a 1- or 2-year basis; locate positions in American schools where overseas faculty could be placed on *pro tem.* basis for advanced clinical and research training; and to establish a central registry to make available information on personnel and educational opportunities, both in this country and abroad, to any agency interested in international medical education.

The Association invited deans of all Latin American medical schools to the 1960 annual meeting in Miami. Twenty-nine representatives of Latin American medical education responded, of which twenty were deans, vice-deans, directors, or secretaries of the faculty. A special program was arranged to acquaint the visitors with the organization, faculty and student body of the North American university and its medical school. A discussion of the history and function of the Association of American Medical Colleges and the Council on Medical Education and Hospitals of the A.M.A. was given. Dr. Darley presented a proposal for formation of a Pan-American Federation of National Associations of Medical Colleges. The Latin American medical educators also attended general sessions of the Association meeting. After considering the proposal for formation of a federation, they recommended that the Association appoint a committee to make plans with regard to its organizations and functions.

The Association sent a delegation made up of Dean Maxwell Lapham, of Tulane University School of Medicine, and Associate Dean John A. D. Cooper, of Northwestern University Medical School, to the Second Conference of Latin American Faculties of Medicine held in Montevideo, Uruguay, in December, 1960. During the round-table workshops the proposal to form a federation was discussed by the participants and a resolution adopted in the final plenary session endorsing the plan (8).

Since 1960, foreign fellowships for junior and senior medical students, made possible by a $180,000 grant from Smith Kline and French, a Philadelphia pharmaceutical firm, have been administered by the Association of American Medical Colleges. The fellowships provide funds to meet travel costs and living expenses for 10-12 weeks at overseas locations. In 1960, 29 qualified students studied in nineteen foreign countries, and the 30 appointed this year will travel to such places as Pakistan, Korea, Japan, Burma, Haiti, New Hebrides, India, Thailand, Cambodia, Borneo, Liberia, Nigeria, Ghana, Republic of Congo, and Tanganyika to work in mission hospitals and outpost medical facilities. This program promotes better understanding of international problems, both medical and social.

Darley and Cain (12) have proposed a National Academy for Continuing Medical Education to fill the gap between the need and the programs available for postgraduate training of the physician. The Academy is visualized as a supplement to the local, regional, and national efforts of professional groups. The Academy would be established as an educational enterprise operating with the philosophy of a graduate school, under a board of governors or regents chosen from the major professional societies and the Association of American Medical Colleges. A full-time administrative

faculty and staff organized on departmental lines under a chief administrative officer would formulate long-range programs and develop subjects to be taught. The proposal envisages drawing able lecturers, demonstrators, and panel members from medical schools and the profession. Financial support could be provided by foundations, voluntary health agencies, industry, and federal sources. An intensive study and analysis of the internship in 27 university hospitals, financed by the W. K. Kellogg Foundation and directed by Richard J. Saunders, Jr., has just been published (33).

Through its publications the Association has provided valuable information on many aspects of medical education. Its *Journal of Medical Education* is the only monthly journal in the world devoted exclusively to medical education. The annual Admission Requirements of American Medical Colleges, and the Directory listing administrative staff and department heads in all United States and Canadian medical schools are invaluable as reference books. The reprinting of the Deitrick and Berson "Medical Schools in the United States at Mid-Century" again makes available this sound analysis and evaluation.

The Association established to promote "the improvement and advancement of medical education" has shown continual growth. It serves as an effective and influential voice of America's medical schools.

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Activities and Accomplishments of the American Medical Association in the Field of Graduate Medical Education

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SUMMARIO

Education medical *graduate* se define como le maestramento, in le forma de internatos, residentias, sociatos (fundationes pro mantener un studente graduate), o altere typos de trainatos, in disciplinas basic e clinic, subsequente al acquisition del grado de D. M. que termina education medical *subgraduate*. Un revista del disveloppamento de education medical graduate in le Statos Unite monstra le rolo crescentemente importante jocate in illo, specialmente desde 1920, per le Consilio de Education Medical e Hospitales del A.M.A. On summarisa 3 grande "eras" in le evolution historic: (1) le "Era de Internato" initiate in le prime decennio de iste seculo; (2) le "Era de Residentia" inglobante le periodo de adjustamento post le Guerra Mundial I; e (3) le "Era Hospitalari" que sequeva le disruption de patronos establite que accompaniava le Guerra Mundial II. Durante iste ultime periodo, le Consilio habeva un rolo importante in le organisation del participation de medicos estranie in le programmas approbate de maestramento graduate. Le responsabilitates del Consilio in le area de maestramento graduate son describite sub 4 titulos principal: (1) *Evalutation* (del programmas approbate de internatos e residentias); (2) *Communication* (inglobante non solo le correspondentia con institutiones e directores de programma individual ma anque le preparation de un amonta enorme de datos detaliate pro enumeration in le Numero de Internato e Residentia annual del Jornal del Association Medical American, e le organisation del Congresso de Education Medical e Licentiamento annual); (3) *Liaison* inter circa 50 organisationes e agentias national que se interessa in le maestramento de medicos juvene; e (4) *Analyse de Programmas e Projection de Tendentias.* Iste functiones que ingloba un scrutinio continue del standardos existente de maestramento, e le prognostication de tendentias futur in practica medical, deveni de plus in plus vitalmente importante in adjutar de solver problemas actual e de satisfacer necessitates futur in education medical graduate.

Two years have elapsed since the report in this same journal of the role played by the Council on Medical Education and Hospitals of the American Medical Association in all parameters of medical education (8). This report is confined to the single area of graduate medical education which embraces the years of formal training for the young physician after receipt of the M.D. degree and before entrance into active practice.

In many areas of the world, higher education beyond baccalaureate degree programs is termed "graduate education." In the United States, this terminology still obtains for programs in law, theology, engineering, and other scientific disciplines for which the Ph.D. or other higher degrees are awarded. In medicine, however, the 4 years of study in a medical school or college which terminate with the award of the M.D. degree are termed "undergraduate medical education." The subsequent years of formal hospital or other institutional training in the form of internships, residencies, fellowships, or other types of traineeships in basic or clinic disciplines constitute "graduate medical education." The term "postgraduate medi-

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cal education" which might be used in other countries to describe the internship or residency is restricted in this country to those short-term and intermittent educational activities for physicians engaged in the active practice of medicine. These postgraduate activities are now more properly termed "continuation medical education."

HISTORICAL DEVELOPMENTS

Curran (2) has shown that young physicians were employed under a variety of terms on the house staffs of the earliest hospitals founded in Colonial America. The term "resident" actually antedates the term "interne," this latter term having been used for more than a century in France before finding acceptance in this country. The earliest reference to the term "interne" in American hospital records which is known to the Council is contained in the 2nd Annual Report of the Board of Trustees of the Boston City Hospital for the year ending December 31, 1865. This report noted the appointment of an "ophthalmic interne." The 19th Annual Report for 1882-83 first listed medical and surgical internes in addition to "house officers."[1]

The developments in graduate medical education in America since 1900 can be divided roughly into three eras, each of about 20 years' duration. These may be termed the Internship or Pre-World War I Era, the Residency or Post-World War I Era, and the Hospital or Post-World War II Era. We are now entering a fourth era which we may term the Manpower Era, and which it is hoped will not be known as the Pre-World War III Era.

Internship era.—It was not until 1901 that the *Journal of the American Medical Association* published the first "Education Number." By 1904, when the Council on Medical Education was created with a permanent staff, the internship had become recognized as a desirable feature of medical education by students, physicians, and medical schools. Whereas the necessity for a hospital internship between medical school graduation and licensure examination was only a suggestion under the "ideal standard" of medical education adopted by the House of Delegates in 1904, 70 per cent of all medical school graduates were electing to take internships voluntarily by the time the first list of approved internship hospitals was published in 1914. That list contained 603 hospitals which were approved for 3,095 internships in the clinical branches of medicine and surgery. The state of Pennsylvania was the first to require internship prior to eligibility for licensure in that same year (5).

In June, 1916, the House of Delegates recommended that the Council on Medical Education secure such information as it could regarding all medical colleges abroad, and that it prepare a list of such institutions as it deemed worthy of recognition and submit such list to the state licensing boards of this country.

As a result of the survey activities of the Council in connection with the internship approval program, it had become clear by 1919 that the existing facilities for training were quite inadequate. In that year, standards were accordingly developed and established by the Council as the "Essentials of an Approved Internship."

Residency era. — The second great era included the period of readjustment following World War I and saw the custom of "postgraduate" study in European medical centers decline. Because the expanding responsibilities of the Council were extending into the hos-

[1] J. M. Faulkner, personal communication.

pital field, the House of Delegates changed the title of the Council in 1920 to the Council on Medical Education and Hospitals.

While the term "resident" had been used in this country for many years, residencies existed primarily at university-affiliated hospitals for the first two decades of the present century. By 1920, the Council had become concerned with the educational standards for preparation of physicians to practice in the specialties, and had created committees to study this problem. It is of interest today that a Committee on Graduate Medical Instruction recommended at the Annual Congress on Medical Education on March 7, 1921, that the required period of training beyond the internship should be generally 3 years in order to acquire expertness in these specialties (6). By 1923, the House of Delegates, on recommendation of the Council, had adopted standards for specialty training which were finally published in 1928 as the first "Essentials of Approved Residencies and Fellowships." The first list of approved residencies was published in 1927 for 278 hospitals offering positions to 1,776 residents. In that year, the number of approved internships exceeded the number of approved residencies by a ratio of 3:1 and was very slightly in excess of the number of medical school graduates.

In April, 1926, the Council on Medical Education and Hospitals recommended to state licensing boards that the credentials of all foreign graduates be carefully investigated and that they not be accepted unless positive information regarding the educational standard of the medical school could be obtained. The Council further stated that no undue obstacles be placed in the way of the foreign physicians of *known qualifications* who desire particularly to secure graduate medical education in this country.

The decade of the 1920's witnessed a steady increase in the number of approved internships, but many, particularly in the university-affiliated hospitals were of 2 years' duration. When spent in rotation through the major clinical services this 2-year period was generally accepted as adequate preparation for the entry of the young graduate into general practice.

Concern of the House of Delegates in 1931 over appropriate methods of recognition of qualified specialists resulted in the organization of the Advisory Board for Medical Specialties in 1933. At that time, the Council was authorized to approve special examining boards which met standards formulated by the Council (7). The Advisory Board was officially created in 1934 with representation from each of the four specialty boards in existence at that time. The rapid creation and approval of other specialty boards in the next few years led to the establishment of additional residencies for candidates desiring to establish their eligibility for certification by one or another of the boards.

In 1937, the Commission on Graduate Medical Education was organized through the activities of the Advisory Board for Medical Specialties, and its report in 1940 was the first published book on Graduate Medical Education (4).

Hospital era.—The third great era in graduate medical education followed the disruption of established patterns accompanying World War II. During the war years, the length of internships was shortened and more residencies were established, so that, by 1946, the number of approved residencies exceeded the number of approved internships for the first time. Largely as

the result of military service requirements, the vast majority of internships had been shortened to 12 months. The deficits in medical education created by the war, plus postponement of graduate training for thousands of young physicians led to unprecedented demands for residency training when they returned to civilian life.

By 1947, nearly 9,000 more residencies had been developed than had existed in 1941; and it was felt that this expansion was justifiable in the interests of the training needs of physician veterans. It was also felt that this acute demand would subside, thus justifying a reduction in total residencies to a somewhat lower figure, if high educational standards were to be maintained. The Council clearly foresaw another aspect of this expansion of residency opportunities and published the following statement:

> Yet this country would be remiss in its world responsibility if it fails to recognize that these newly developed training facilities should be continued, when quality warrants, so that opportunities can be offered for many years, to provide advanced education for the physicians of foreign countries, which are looking to the United States in increasing numbers to exercise world leadership in medicine. The additional residency programs, of high quality, and positions which have been developed for veterans should be available later to the physicians of foreign countries who wish to carry back to their own lands a measure of the superior quality of medical practice in this country (5).

The trend toward specialty training by increasing numbers of American graduates encouraged the approval of residencies at a greatly accelerated rate, so that although the increase in internships since 1941 has been only about 50 per cent the increase in residencies has been over 500 per cent. This has resulted in a complete inversion of the pre-war pattern of house staff structure which generally consisted of a broad intern base with a progressively narrowing resident superstructure in pyramidal fashion. Today, the pyramid is inverted, so that interns are in the minority in most hospitals, and 40 per cent of the hospitals approved for graduate training have residencies only with no internships at all. Today, 856 hospitals offer 1,097 approved internship programs for 13,032 physicians; and 1,307 hospitals offer 5,647 approved residency programs for 31,733 physicians.

During this third era, the relationship of graduate training programs to hospital service patterns came into critical focus. Government-assisted hospital building programs plus rapid increase in prepaid hospital care types of insurance combined to produce a rate of hospital utilization which placed an unprecedented burden on the medical profession for the delivery of medical care in the hospital environment. Competition between hospitals for the services of interns became intense, and the National Intern Matching Program was inaugurated in 1951, whereby senior medical students were given the fairest possible opportunity to obtain appointments among the hospitals of their highest preference. No matching program has been developed for residencies.

Whereas the Council had correctly forecast the participation of the foreign medical graduates in approved training programs, it did not anticipate the magnitude of the influx of large numbers of foreign-trained physicians following the inauguration of the Exchange-Visitor Program of the Federal Government in 1949. In that year the House of Delegates authorized the Council to establish an advisory list of foreign medical schools which appeared to provide adequate educational

programs. The Exchange-Visitor Program made it possible for foreign physicians to spend years in this country without the requirement of licensure, provided they could secure intern or resident appointments in approved programs. As a result, many hospitals with vacancies on their house staff rolls filled them with foreign physicians whose qualifications and even credentials were frequently difficult to verify. It soon became apparent that some better mechanism was needed to identify those foreign medical graduates who were properly qualified to benefit from participation in approved programs. Accordingly, the Council was authorized in 1954 to initiate a procedure for evaluating individual graduates rather than schools.

In October, 1957, the Educational Council for Foreign Medical Graduates was established through the cooperative efforts of the American Medical Association, the American Hospital Association, the Association of American Medical Colleges, and the Federation of State Medical Boards. Henceforth, certification from the ECFMG will be necessary before a foreign medical graduate can be appointed to an approved internship or residency in the United States.

Manpower era.—With the advent of the 1960's, the fourth great era in graduate medical education is upon us. The present patterns of graduate medical education must now be reviewed critically in relation to the developing patterns of medical practice and the needs of society for the future. The provision of optimum hospital medical services is a matter of grave concern in relation to the improved economic status of the public, and the lag in development of adequate facilities for producing physicians at a rate related to the increase in the population. This era might properly be termed the era of crisis in medical manpower.

SPECIFIC COUNCIL RESPONSIBILITIES

The activities of the section on graduate education of the Council on Medical Education and Hospitals can be described under four major headings:

Evaluation.—With the publication of the first lists of approved internships, the Council assumed an obligation of evaluating those programs periodically according to established standards. The addition of residencies to this task made it necessary to employ a field staff of trained physicians in 1928. Throughout the year, nine full- and part-time physicians now conduct hospital program surveys in all specialties and prepare detailed reports on the effectiveness of the programs and their conformance with the established standards. At the conclusion of World War II, with the progressive, rapid increase in requests for approval of residency training programs, it became clear that improved methods of evaluation must be devised. Accordingly, representatives of the various specialty boards and of certain other national specialty organizations agreed to join with the Council in evaluating residency training programs (1). As a result, there are now special residency review committees for most specialties including general practice, and there is an internship review committee with representation from the Council, the American Hospital Association, the Association of American Medical Colleges, the Federation of State Medical Boards, and the field of general practice. These committees are assisted in their work in some fields by individuals or teams representing the specialty concerned, which make special survey visits in addition to those of the field representatives. Full-time physicians

of the Council staff act as secretaries of the review committees and conduct all official correspondence regarding approval or disapproval of graduate training programs.

Communication.—The communication reponsibilities of the Council staff included not only the correspondence with the individual institutions and program directors as mentioned above, but also the preparation of the vast amount of detailed data for listing of each approved program in the annual Internship and Residency Number of the *Journal* published at the time of the annual report on graduate medical education. These data are secured through an annual questionnaire to each institution, but the listing in the Directory is determined by the action of the review committees. The Directory of Approved Internships and Residencies has become progressively larger over the years, and in the future will be published separately from the annual report on graduate training which will appear in the *Journal*. The Directory will be distributed to all program officials and other interested agencies and will be available as a reprint.

In 1960, a significant policy decision by the Council resulted in improved service to all graduates of American medical schools. Each graduating fourth-year student was given a complete copy of the Directory of Approved Internships and Residencies appropriately bound as the Directory of the National Intern Matching Program. This contained the annual report on graduate medical education, the complete description of the operation of the matching program, the lists of all approved programs with hospital addresses and detailed data, the Essentials of an Approved Internship, the Essentials of Approved Residencies, and the requirements of each of the approved nineteen American specialty boards (3). It is planned that this distribution will be continued annually for all American medical school graduates, including the small number who do not participate in the National Intern Matching Program.

Another important exercise in communication discharged by the Council is its conduct of an annual Congress on Medical Education and Licensure since 1905. At this 3-day meeting, a forum is provided for discussion of many of the problems involving graduate medical education as well as other phases of medical education; and selected papers of this Congress are published subsequently in *The Journal of the American Medical Association.*

Liaison.—There are approximately 50 national organizations and agencies with which continuing liaison is necessary. Each American specialty board is deeply concerned with elevating the standards of graduate medical education, as are many of the national specialty societies. State and local medical societies continually request consultation and information as to present policies and future trends in graduate education. Federal agencies, groups interested in international exchange, national foundations, and many other organizations look to the American Medical Association for information and guidance on matters affecting the training of young physicians.

Program analysis and projection of trends.—Because of its intimate and detailed knowledge of training programs across the nation, the Council staff has the responsibility of analyzing continually the data in its files in order to assist where possible in the projection of future needs and the recommendation for appropriate mechanisms for meeting these needs. Ad-

vances in medical care and in medical teaching suggest continual scrutiny of the existing standards of training. Proposals for elevation of educational and training standards may originate from many sources, but it is the responsibility of the Council on Medical Education and Hospitals to bring these proposals to the House of Delegates for policy decisions and for incorporation into the "Essentials" or elsewhere for dissemination throughout the nation.

CURRENT PROBLEMS

Among the current problems facing American medicine and having a direct impact on the activities of the Council are those related to the alleged undersupply of interns and residents, the current oversupply of approved internships and residencies, the rapid influx of foreign graduates for advanced medical training, and the economic factors influencing the length of training a young physician is able to afford if he is married and has a family or is heavily in debt.

A factor of continuing concern to the Council is the relationship of the educational aspects of approved training programs to the service which inevitably results from such programs. Such service has great value, but when not maintained in relation to the educational values received by the trainee, becomes a factor which may lead to disapproval of the program by the Council. This problem has become particularly acute in recent years because of the increasing orientation of patients toward hospital medical care, and the resultant greatly increased hospital utilization. The rate of admission and discharge of patients to hospitals has greatly accelerated, and this places a greater premium on professional assistance for the private physicians on the hospital attending staff.

FUTURE TRENDS

Specialism continues to rise in this country, and numerous groups are concerned because decreasing numbers of physicians are attracted into training programs which will fit them for general practice. The Council is responsible for maintaining standards of programs aimed at preparing the physician for family practice in the future and continually examines these programs in the light of the expressed needs of society. It seems clear that the pattern of graduate training which has been developed in this country over the past 40 years is in need of searching re-examination in view of the length and the cost of such training to the young physician of today.

Certain other trends have become apparent in the past 15 years. Increasing numbers of hospitals with approved training programs and no affiliation with medical schools are experimenting with the employment of full- or part-time, paid directors of medical education. In addition to these physicians, some hospitals have added full- or part-time, paid chiefs of the various major services. Other hospitals are employing full-time licensed physicians to carry some of the service burdens of the hospital clinical departments as well as emergency rooms in those situations where interns and residents are either not available or cannot be expected to cover all such service demands.

Because of the continual development of residency training programs and improvement in clinical clerkships, the place of the internship in graduate training has been questioned for many years. It is hoped that a decision will be made in the not-too-distant future relating more effectively the period of time now filled by the internship to the period of time now filled by the residency. Efforts will undoubtedly be made to assess the

needs of the nation in terms of the optimum numbers of physicians in the various categories of general and specialty practice so that training programs can be geared to those needs.

One of the significant major developments of the future is already becoming apparent. This relates to the provision of medical care, particularly in a hospital environment, by a team of specially trained individuals of whom the physician may be only one member. Other individuals may be added to these teams to assist the physician in delivering certain services of a professional nature. Without direction and supervision by a competent physician, such teams cannot function properly. This development implies significant changes in the types and methods of training for physicians who will assume this greater responsibility in the future. The establishment of standards for these types of educational programs may become a major responsibility of the Council in the field of graduate medical education during the present era of the crisis in medical manpower.

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MEDICAL EDUCATION FORUM

Editorial

THE SOCIAL AND CULTURAL BACKGROUND OF MEDICAL EDUCATION IN THE UNITED STATES*

Every activity and every institution of a people or of a nation are in different ways and in varying degrees a reflection of the culture and society of the people and of the nation. The United States of America has many different social and cultural traditions. The original settlers on the eastern coast were largely from Britain. In the southeast, as far north as Georgia, the Spanish influence was dominant for many years. In fact, it was at the Battle of the Bloody Marshes at Sea Island, Georgia that the decision was made as to whether British influence would spread southward or Spanish influence spread northward. Spanish influence was also predominant in the west and southwest as it filtered northward from Mexico. On the Gulf Coast around New Orleans the original traditions were established by the French. In the subsequent 1½ centuries many other cultures were introduced through immigration, largely from Europe, either gradually or in response to events in certain nations. The revolution in Germany in 1848–49 sparked a massive movement of peoples to the United States. Thus, at one time or another peoples of Scandinavia settled in Minnesota, from Ireland in Boston and New York, from Poland in Chicago, from Italy and eastern Europe in New York, from Hungary in Cleveland, from China in San Francisco, to mention only a few. In the 1930's Cleveland, Ohio was the second largest Hungarian city in the world, next to Budapest, and even today Chicago is the second largest Polish city in the world, next to Warsaw. In recent years the influx of Puerto Ricans into New York has and will have an impact on the society of the city. Many speak only Spanish, and their cultural traditions and values are Spanish.

With the passing of the decades and of the centuries there has been a gradual amalgamation of these varying cultures and social traditions through the so-called "melting pot," but this is not complete by any means. Let me cite just one example as it relates to medical education: In many universities and medical colleges attendance at commencement by the family and friends of the graduates is limited, and even the graduates try to avoid attendance. Each graduate requests only two to four seats. In Brooklyn the situation is sharply different. Our graduates request an average of seventeen tickets each, and we almost never have a graduate absent; in other words, for a graduating class of 140, we have about 2,500 people in the auditorium. The reason for this is really quite simple. Our students are drawn largely from social groups in which higher education and preparation for a professional have not been a group or family tradition. In many instances the young man or woman who

* Presented at the Conference of Foreign Scholars, Rochester, New York, June 25, 1961.

is, on commencement day, to become a doctor of medicine, is the first individual in this family ever to gain a professional degree and probably is of the generation in which anyone in the family pursued higher education. It follows that everyone, father and mother, brother and sister, aunt and uncle, and cousins, bursting with pride, attend commencement exercises to see their relative join the most honored of professions—medicine.

In the same vein, let me cite a related example. Most universities in the United States have commencement exercises in the morning. In Brooklyn, we have them in the evening. Again, the reason is relatively simple. The families of most of our students are workers, paid by the day or hour and only for the time they work, and are not on monthly salaries, or are small shopkeepers in the European tradition, in which husband and wife between them tend store 12–16 hours a day with no other clerks. If we had commencement in the daytime it would work a hardship on many.

With these two examples, I introduce the theme of this presentation on "The Social and Cultural Background of Medical Education in the United States"—namely, that education in general, and medical education in particular, are at any one time a reflection of the society, the culture, and the traditions of the people participating as students and faculty, and of the region and nation in which the college is located. Further exposition of this theme might be carried out in several ways. The over-all development of medical education might be traced from its beginnings to the present or the major characteristics of present day medical education might be explored in terms of how it came to be the way it is. I shall follow the latter approach under five topics: the general form of higher education, economic growth of the United States and private philanthropy, the relation of medical education to general higher education, education in a democracy and limitation of enrollment, and progress through scientific research. There follows a brief summary and a final epilogue.

THE GENERAL FORM OF HIGHER EDUCATION

The early immigrants from Britain to New England, motivated largely to live in a land where they could practice their own religion, brought with them the only type of higher education they knew—the private residential college of the Oxford-Cambridge form, with masters and dons who not only provided a classical education but presided over the private and spiritual lives of the students, since most of the colleges were under sectarian sponsorship or control. Higher education was largely for men, and it was some years before what were early called Female Colleges or Women's Colleges were established. For example, in Boston, Harvard College for men was founded in 1636, and Radcliffe College was not founded until 1879, 243 years later. In Providence, Rhode Island, Brown first admitted men students in 1764; but Pembroke College for Women did not come into existence until 1891, 127 years later. Thus, the basic pattern of higher education of the first two centuries in the United States, in keeping with the society and culture of the times was private, classical, residential, for men only, and under religious influence.

With the great push to the west in the middle 1800's, culminating in the gold rush to Feather River Valley of California in 1849, new elements appeared. The swelling thousands on the Great Plains of the Midwest were not an indus-

trial society such as in New England. Here agriculture and mechanical arts were the form of livelihood. Neither were there small or large fortunes which could be used to endow new educational institutions. These two changes in society and culture certainly were largely responsible for the passage of the Morrill Act in 1862, which provided grants of public land to the States, the proceeds of the sale of which were to be used by the State as a perpetual fund to support "at least one college where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in several pursuits and professions in life."

Although some states had established publicly supported colleges or universities before the Morrill Act of 1862, the impetus of this Act was great. The University of North Carolina opened in 1795 and the University of Georgia in 1801. Indiana in its original constitution in 1816 made it the duty of the general assembly "to provide by law for a general system of education, ascending in regular gradation from township schools to a state university, wherein tuition shall be gratis, and equally open to all." However, within a decade after 1862 state colleges or state universities were established in most of the states, in some with opposition from several groups, particularly religious groups. The entrance of the state and of public tax funds into higher education influenced viewpoint and approach to many problems. The Federal and State Constitutions provided for separation of church and state, and, therefore, the new state universities were nonsectarian. The state universities emerged at a time when it was becoming accepted that women should have equal opportunities in higher education. Accordingly, most state universities from the beginning or soon after their establishment admitted women on an equal basis with men. The State University of Iowa granted a bachelor's degree to a woman in 1863 and the University of Wisconsin opened all departments and colleges to women in 1866.

Thus, by the turn of the twentieth century, the present-day pattern had been established, again in response to changing patterns of our society and culture—a combination of public and private colleges and universities providing all types of higher education, classical, technical, and professional—open equally to men and women, some residential and some urban, and with decreasing sectarian influences. There were in the mid-1950's in the United States 1,300 degree-granting institutions of higher learning, with about half the students in publicly and half in privately supported institutions.

ECONOMIC GROWTH OF THE UNITED STATES AND PRIVATE PHILANTHROPY

As I have indicated in the preceding section, higher education in the early days of the United States was entirely private and was made possible in large part by private gifts. Harvard College, the first, was established in 1636 through the combination of a bequest of John Harvard, a bachelor and Puritan minister, of 780 pounds sterling and 260 books, and a grant of 400 pounds sterling from the General Court of Massachusetts. Yale University was so named because of a gift in 1718 of books and of East India goods which were sold for 562 pounds,

12 shillings, by Elihu Yale, former governor of Ft. St. George, Madras, India, and a native of Boston.

The early American brought with him the tradition of the society and culture of Britain of private philanthropy in aid of higher education which largely created Oxford and Cambridge and many of the so-called public schools of England. This tradition we see in the names of Tulane University, Cornell University, Emory University, Vanderbilt University, Stanford University, and Duke University.

This phase of our society, private philanthropy, has had a profound influence on medical education. With the industrial revolution of the last half of the 19th century, large fortunes were accumulated. I shall mention only three which seem to me to have been critical in the development of the present pattern of American medical education.

Certainly one of the most influential was the bequest of the entire fortune of $7,000,000 by a Quaker merchant and banker of Baltimore, Maryland, Johns Hopkins, equally divided between a university and a hospital. Under the brilliant leadership of Daniel Coit Gilman, the first president of the newly established Johns Hopkins University, new standards of scholarship in all higher education including medicine emerged. For the first time a 4-year liberal college education was required before admission to the medical school, opened in 1889. From this has grown our programs of premedical education to insure that the physician is an educated citizen as well as a scientist and practitioner.

A secondary gift to the Johns Hopkins Medical School as it opened also had a long-term influence on medical education. Most medical schools were not open to women. Elizabeth Blackwell had been awarded an M.D. degree in 1849 by Geneva Medical College of Western New York, now Hobart College, but few schools followed suit. The Trustees of Johns Hopkins were a little short of funds to open the medical school. A group of women, under the leadership of Elizabeth Garrett, subscribed an endowment of $500,000 and offered it to the Trustees on condition that women be accepted as students on an equal basis with men. The gift was accepted, and we had leadership by a leading institution for women in medicine. The leader was ahead of its society and culture, but the pattern was set.

The second major act of philanthropy which I wish to mention because of its lasting impact on medical education is that of a Scotsman who came to this country as an immigrant boy of 13 to settle in Allegheny, Pennsylvania—Andrew Carnegie. By the time of his death in 1919, at the age of 84, he had given away or bequeathed $333,000,000. The one gift with which we are here concerned was the establishment of the Carnegie Foundation for the Advancement of Teaching in 1905, with an original gift of $15,000,000. Under the able direction of Henry S. Prichett, then president of the Massachusetts Institute of Technology, many aspects of American education were explored, not the least of which was the assignment of Dr. Abraham Flexner to survey American medical education. This he did with such brilliance, wisdom, and perseverance that the publication of Report No. 10 of the Foundation resulted in the closing of many poor schools and improvement of the others. American society under leadership of this type was beginning to demand high standards for the education of those who were to be their physicians in the future.

The third and final example of private philanthropy in relation to a lasting effect on medical education which I wish to mention was also made by one who started at the bottom—assistant bookkeeper for the Commission Merchants, Hewitt and Tuttle, in Cleveland, Ohio, at less than $4 a week in 1855. When Mr. John D. Rockefeller died in 1937 he had given away $530,000,000. In addition, his son, John D. Rockefeller, Jr., had up to the end of 1953 contributed to various activities $346,000,000. The two foundations with which we are here concerned are The General Education Board with an original gift of $129,000,000 and The Rockefeller Foundation with an original gift of $241,000,000. Gifts from these two foundations from capital and income through 1955 totaled over $835,000,000. A significant amount has gone to medical education. The influence of these gifts on medical education has been manifold, but two are, as I see it, outstanding—encouragement of gifts by others by use of the matching principle, and major gifts to a few places to establish the highest standards to which all others would aspire. One of the items of highest standards which was encouraged and supported was the introduction of true full-time faculty, first in the basic science departments and then in the clinical departments. Today, all American schools have a core of full-time faculty in most departments.

Thus, the economic development of our society as an industrial nation has, through the philanthropy of the industrialists, had a major effect on medical education.

THE RELATION OF MEDICAL EDUCATION TO GENERAL HIGHER EDUCATION

Although a few of the early private colleges accepted the responsibility for medical education, the major burden in the prerevolutionary and postrevolutionary periods was in the Hippocratic tradition of preceptorship either individually or in groups.

The College and Academy of Philadelphia, now the University of Pennsylvania, chartered in 1755, opened a medical department in 1765, the first in the American Colonies. Two years later in 1767 Kings College, which had been chartered in 1754 in New York City, created a medical department which is now the College of Physicians and Surgeons of Columbia University. Yale established the medical department in 1810. During this period many went to Britain or to the Continent for their medical education, particularly for postgraduate training.

In spite of the interest of a few leading universities in medical education, largely in the East, the opportunities were not equal to the need or the demand, especially in the rapidly expanding Midwest. Enterprising physicians, some with altruistic objectives and some with an eye for monetary profit, organized independent medical schools. The usual curriculum was a course of lectures for a year. Tuition was paid, and at the end of the year, after allowance for expenses, the "profit" was divided among the professors. Since human beings are what they are the world over, it is not remarkable that every gradation of school from good to bad evolved. However, by the early 1900's the bad were having too much influence on the general level of medical education and medical practice. I have already mentioned the response of society to this—the survey of medical education by Abraham Flexner under the sponsorship of the Carnegie Foundation for the Advancement of Teaching. The finger was pointed at not

only the proprietary and independent schools, but also at the university school. A school with which I was connected for 15 years and perhaps am, therefore, prejudiced that it is one of the better schools in America today—the Washington University School of Medicine in St. Louis—came under fire. After the survey of the school, Mr. Robert Brookings, president of the Board of Trustees, asked to see Mr. Flexner. Mr. Brookings opened the conference, "Well, Mr. Flexner, what about it, do we have a good school?" Mr. Flexner retorted, "You really want to know?" Mr. Brookings, a forthright man, answered, "Certainly." Mr. Flexner, equally forthright, used few words—"Reorganize it or close it up."

Analogous conversations probably went on all over the country, and within a few years American medical education entered a new era. The surviving schools became a college in a university with the academic standards of the university. This came at about the same time as the rise of private philanthropy which I outlined in the preceding section, and large resources were poured into medical education for its rejuvenation. Again, to take one example with which I am familiar, Washington University in St. Louis, within a few years matching gifts from the General Education Board (which I mentioned earlier as a philanthropy of Mr. Rockefeller Sr.) and from local citizens endowed the Bixby professorship of surgery, the Busch professorship of medicine, the Mallinckrodt professorship of pathology, the Culver department of surgery, the Millikan department of medicine, the Mallinckrodt department of pediatrics, and the Mallinckrodt department of pharmacology.

A related problem is the physical relation of the medical school and the university. Most of the early medical schools were established in or adjacent to the charity hospital of the city. This was usually not near the university. After the reformation of 1910, it became increasingly apparent that, if medical education was to become a full member of the university, a close physical union was desirable. This has not always been possible because of a large investment in a plant at a distance from the university; but present-day thinking is clear—only one new medical school has been built in the United States since 1945 off the general university campus, witness, California at Los Angeles, Kentucky, Florida, North Carolina, West Virginia, and Missouri; and in all a university hospital has been built as a part of the campus structure. Just a few years ago Stanford University abandoned its plant in San Francisco and built a new school and hospital on the campus at Palo Alto; certainly a high price to pay for a principle, but in their opinion and that of most, worth it.

Thus, in the last century, the United States has moved from a few university and many independent and proprietary medical schools, most woefully weak, to fewer schools, all strong, and with most closely integrated intellectually with a university, and many physically integrated on the university campus.

EDUCATION IN A DEMOCRACY AND LIMITATION ON ENROLLMENT

The United States is known as and today is the land of universal education, but it has not always been that way. In fact it took about 75 years from the signing of the Treaty of Paris to the end of the War between the States to develop educational policies dedicated to the national ideals of democracy, equality, and freedom. A democracy could not exist unless all people were educated for their responsibility as citizens. If talents were to be rewarded

on the basis of ability and not class or economic privilege, all must have equal educational responsibilty. And, if there was to be true religious freedom, education must be divorced from sectarian control.

If these objectives were to be attained, there was only one form of education: a system of public schools supported by taxes, free, universal, and open to all. To accomplish this laws had to be enacted in the legislatures of the states. The decisive victories were in Massachusetts in 1827, in Pennsylvania in 1834, in New York in 1867, in Connecticut in 1868, and in most of the midwestern states in the 1850's. Within a few decades the universality of educational opportunities was extended to high school, and, as I have already outlined, the movement to publicly supported state universities had its genesis in the Morrill Act of 1862. Massachusetts not only led in providing free primary education, but was the first state to enact compulsory attendance laws in 1852. It was, however, another 66 years before all the states had similar laws: in 1950 six states required attendance to age 18, another six to age 17, and the remainder to age 16.

However, society was not then ready, and even today it is not ready, to accept the responsibility for the education of its professional men and women. As I have outlined in the preceding section, the response of the people to this was the establishment of the independent and proprietary medical school. In the end, because of the abuses of such a system, society reacted, closed the poor schools, and accepted the principle of limitation on enrollment in certain phases of higher education, notably in the professional schools.

At times there are cries against a system which denies opportunity to any citizen, and the tide has been rising in the 15 years since the end of World War II. Legislatures and the Trustees of state universities have enacted laws and regulations restricting or limiting enrollment of nonresidents of the state or placing an extra tuition charge on nonresidents. There are demands on every side for larger enrollments and/or more medical schools. The schools have responded. Enrollment in the freshman class has increased from less than 7,000 to more than 8,000. The number of schools has increased from 78 to 86.

There are definite signs of acceptance by the state of greater responsibility. California has established a second state medical school and has committed itself to a third. Arizona and New Mexico are committed to begin 2-year medical schools. Texas converted a private school to a second state school and has agreed to start a third state school. New York is now supporting two state schools and will within a year take over a third, all previously privately supported.

Within this same period Florida accepted the Pennsylvania pattern of State aid for private medical schools, and several other states are seriously considering similar plans.

The Congress of the United States has in the past few years moved slightly, but definitely. There is the 5-year-old Health Research Facilities Act, which provides Federal aid on a matching basis for construction of research facilities in schools of the health professions. There are large appropriations for training grants for research workers, who are at one and the same time future academic faculty members.

Thus, again, I emphasize that education is a reflection of the society in which it exists and is a part. The United States has progressively moved from

private education at all levels for the elect which we inherited from Britain, to free universal primary education, to free secondary education, to publicly state supported higher education, to publicly state supported professional education, to state-aid of privately supported higher and professional education; and now it appears we are about to go to Federal aid to privately and publicly supported higher and professional education. However, I wish also to emphasize, because of what I shall say a little later, that it has taken us almost 200 years to travel this path from limited private medical education to medical education as a national resource and responsibility.

PROGRESS THROUGH SCIENTIFIC RESEARCH

Although the American people in the first century and a half of their existence as a nation recognized and applauded creative ability, it was not a part of our society and culture to use creative ability as an instrument of national policy. Whitney for his cotton gin, Fulton for his steamboat, and others were lionized after they completed their discoveries for the benefit and welfare of mankind, but most struggled in abject poverty. What support there was for creative projects or research came from private sources.

At the turn of the century, just 60 years ago, when the Rockefeller Institute for Medical Research was established, the director found himself in a difficult position. In accordance with the deed of gift "to make knowledge relating to these various subjects available for the protection of the health of the public," a scientific journal was founded. It soon became apparent that there was not enough good research in the institutions of the country to provide full numbers of the journal, so grants to do research were made, and the resulting reports kept the journal at a high level of quality.

As short a time as 29 years ago, when I was awarded a grant of $1,000 to assist in the preparation of the microscopic sections in my comprehensive morphologic study of the prostate, the total grants to the Institute of Pathology of Western Reserve University, with such famous names as Howard T. Karsner, Harry Goldblatt, Enrique Ecker, and Alan Moritz, did not exceed $10,000, all from private sources.

The turning point came at the end of World War II. The American people came to realize what research had accomplished during the war in many fields, from release of the internal energy of the atom, to new chemotherapeutic agents for malaria and infectious disease—penicillin, to control of insect vectors of disease—D.D.T., to concentrated foods, to mention only a few.

Under the leadership of the then Surgeon General of the Public Health Service, Dr. Thomas A. Parran, the Congress accepted support of medical research as an instrument of national policy. This year the Federal appropriation for the National Institutes of Health including grants to universities and other research institutions will probably exceed $600,000,000.

This activity has had a profound effect on medical education, mostly for good, although some believe there has been an undesirable side-effect to overemphasize research at the expense of teaching. Educational programs have much more scientific content and less dogmatism. Medical students in increasing number spend their summers and free time during the school year in the research laboratories of the College.

Not only is the support coming at the Federal level, but others are joining. Three years ago, the City of New York, under the leadership of Dr. Leona Baumgartner, accepted the principle of support of medical research at the rate of $1 for each person living in the City. Even before that the State of New York established the Roswell Park Institute in Buffalo which has a large program of basic and clinical cancer research.

And, the end is not yet in sight. The American people, as represented in their city councils, state legislatures, and the Federal Congress, have a continuing and expanding faith in progress to a better and happier life through scientific research and the resulting higher quality of health care.

SUMMARY

The theme of the presentation this evening has been that the program of medical education in the United States today is a reflection of the society, the culture, and the traditions of the people of the United States drawn originally from many different cultures of Europe.

In developing and expanding this theme I have traced the successive attitudes of the people toward all education, toward higher education in general, and toward medical education in particular. As a corollary I had related the impact of the economic growth of an industrial civilization and the resulting private philanthropy, of the increasing demands for educational opportunities and the necessity of limitation of enrollment, and of the recent explosive public support of scientific research.

EPILOGUE

I have chosen to give my presentation this evening at a meeting of foreign medical scholars on "The Social and Cultural Background of Medical Education in the United States," not only to show you how medical education has developed to its present high level, but also so you might understand some of the problems and difficulties we have encountered.

Some of you may think that progress in your nation is slow and that it must be accelerated. More must be done in less time. You must have more medical schools and more physicians immediately.

I ask you to compare what you have done in the 16 years since the end of World War II when you became citizens of an independent nation and compare it with what we have done in the 185 years since the Declaration of Independence in 1776. I do not know the details of all the new nations, but I have visited the Far East on three occasions—1952, 1957, and 1960. Let me cite a few comparisons.

In 1952 India had 30 medical schools and today has 58, a 93 per cent increase. In the same period the United States expanded from 79 to 86, a 9 per cent increase. It is true we started at a higher level, but in this same time most people agree we must have soon at least twenty more schools.

In Thailand, medical education has been continued and expanded, and in spite of the need of physicians, the collegiate education at the premedical level has not been abandoned.

The School of Medicine of the National University of Indonesia at Djakarta has completely revised its clinical teaching to the clerkship type and has built new facilities for the scientific laboratories and the library.

The Philippines in 1958 created a National Science Development Board and authorized it to make grants from Federal appropriations to support research in the medical colleges and universities.

To my knowledge, faculty members in medical colleges in Korea, the Philippines, and Thailand have competed on an equal basis against American scientists and been awarded grants by the National Institutes of Health, United States Public Health Service.

I know each of your nations has much yet to do, just as we have much to do, but do not let anyone tell you that each of you has not telescoped our 185 years into a much shorter period. We in the United States stand ready to assist you to do the things you want to do; that is, to adapt other programs to your society and culture, not to adopt them.

ROBERT A. MOORE
President, Downstate Medical Center,
Dean, College of Medicine,
State University of New York,
Brooklyn, New York

Datagrams*

HOSPITALS MOST FREQUENTLY CITED AS PLACE OF RESIDENCY TRAINING BY FULL-TIME AND PART-TIME FACULTY MEMBERS IN U. S. MEDICAL SCHOOLS

In February, 1961, we published a Datagram (Vol. 2, No. 8A) which discussed the relative standing of medical schools as teacher-training institutions. It was based on information derived from the Faculty Registry. The presentation was divided into two parts—"Full-Time Faculty Members by School of Graduation" and "Top 25 Schools in the Proportion of 1934-58 Physician Graduates Holding Full-Time Faculty Appointments at U. S. Medical Schools."

This particular issue of Datagrams stimulated unusual interest judging from the number of requests for reprints and the volume of related correspondence.

In this issue we have attempted a similar presentation showing in rank order the proportion of U. S. hospitals most frequently cited by medical school faculty personnel as the place of residency training. Residencies fulfilled in foreign hospitals were not considered in the computations.

The presentation for full-time faculty members is shown below in Figure 1.

Among the full-time physicians listed in the Faculty Registry, approximately 7,000 furnished information covering residency. Of these, the largest proportion cited Johns Hopkins as the place of residency training. Three percent of the full-time teachers completed a residency in this hospital.

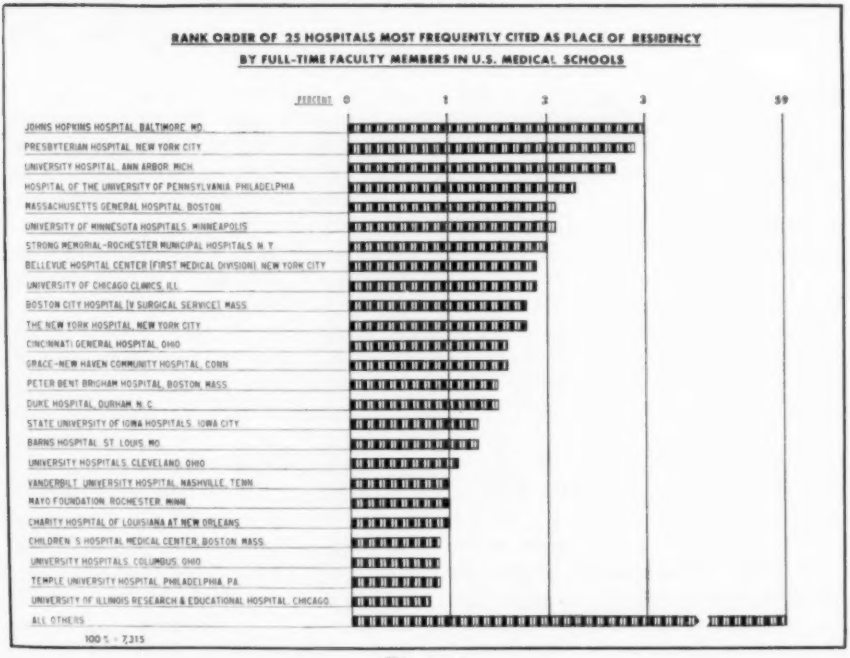
RANK ORDER OF 25 HOSPITALS MOST FREQUENTLY CITED AS PLACE OF RESIDENCY
BY FULL-TIME FACULTY MEMBERS IN U.S. MEDICAL SCHOOLS
PERCENT
0
1
2
3
59
JOHNS HOPKINS HOSPITAL, BALTIMORE, MD.
PRESBYTERIAN HOSPITAL, NEW YORK CITY
UNIVERSITY HOSPITAL, ANN ARBOR, MICH.
HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA
MASSACHUSETTS GENERAL HOSPITAL, BOSTON
UNIVERSITY OF MINNESOTA HOSPITALS, MINNEAPOLIS
STRONG MEMORIAL-ROCHESTER MUNICIPAL HOSPITALS, N. Y.
BELLEVUE HOSPITAL CENTER (FIRST MEDICAL DIVISION), NEW YORK CITY
UNIVERSITY OF CHICAGO CLINICS, ILL.
BOSTON CITY HOSPITAL (V SURGICAL SERVICE), MASS.
THE NEW YORK HOSPITAL, NEW YORK CITY
CINCINNATI GENERAL HOSPITAL, OHIO
GRACE-NEW HAVEN COMMUNITY HOSPITAL, CONN.
PETER BENT BRIGHAM HOSPITAL, BOSTON, MASS.
DUKE HOSPITAL, DURHAM, N. C.
STATE UNIVERSITY OF IOWA HOSPITALS, IOWA CITY
BARNS HOSPITAL, ST. LOUIS, MO.
UNIVERSITY HOSPITALS, CLEVELAND, OHIO
VANDERBILT UNIVERSITY HOSPITAL, NASHVILLE, TENN.
MAYO FOUNDATION, ROCHESTER, MINN.
CHARITY HOSPITAL OF LOUISIANA AT NEW ORLEANS
CHILDREN'S HOSPITAL MEDICAL CENTER, BOSTON, MASS.
UNIVERSITY HOSPITALS, COLUMBUS, OHIO
TEMPLE UNIVERSITY HOSPITAL, PHILADELPHIA, PA.
UNIVERSITY OF ILLINOIS RESEARCH & EDUCATIONAL HOSPITAL, CHICAGO
ALL OTHERS
100 % = 7,315

Figure 1

*Submitted by the Division of Operational Studies of the AAMC.

Listed in descending order according to the proportions of teaching personnel which cited them as the place of residency are the following hospitals: Presbyterian, New York City; University, Ann Arbor, Michigan; U. of Pennsylvania; Massachusetts General; U. of Minnesota; Strong Memorial, Rochester, New York; etc. About 41% of all full-time faculty members reporting completed a residency in one of the twenty-five hospitals listed in Figure 1.

Similar information pertaining to part-time faculty members is shown in Figure 2. Percentages are based on a total of more than 23,000 part-time faculty members who furnished information covering residency.

Here, Mayo Foundation was the most frequently cited as the place of residency training of the part-time faculty members. Approximately 2% of the part-time teachers completed their residency in this institution. Other hospitals ranked at the top of the list are: Bellevue-Columbia (1st Medical Division); Los Angeles County; Presbyterian, New York City; Johns Hopkins; Cook County, Chicago; U. of Pennsylvania; Charity Hospital, La.; Boston City (Fifth Surgical Service); etc. Almost 30% of the part-time faculty held residencies in the twenty-five hospitals listed in Figure 2.

We had hoped to relate the number of teaching personnel according to their place of residency training to the total number of residency positions filled in each hospital over a specific twenty-five-year period. This would have lessened somewhat the advantage of the larger and older hospitals in rank order positions. However, it was impossible to obtain the necessary information to complete the analysis.

RANK ORDER OF 25 HOSPITALS MOST FREQUENTLY CITED AS PLACE OF RESIDENCY
BY PART-TIME FACULTY MEMBERS IN U.S. MEDICAL SCHOOLS
PERCENT
0
1
2
3
7%
MAYO FOUNDATION, ROCHESTER, MINN.
BELLEVUE HOSPITAL CENTER (FIRST MEDICAL DIVISION), NEW YORK CITY
LOS ANGELES COUNTY HOSPITAL, CAL.
PRESBYTERIAN HOSPITAL, NEW YORK CITY
JOHN HOPKINS HOSPITAL, BALTIMORE, MD.
COOK COUNTY HOSPITAL, CHICAGO, ILL.
HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA
CHARITY HOSPITAL OF LOUISIANA AT NEW ORLEANS
BOSTON CITY HOSPITAL (V SURGICAL SERVICE), MASS.
UNIVERSITY HOSPITAL, ANN ARBOR, MICHIGAN
BARNES HOSPITAL, ST. LOUIS, MO.
UNIVERSITY OF ILLINOIS RESEARCH & EDUCATIONAL HOSPITAL, CHICAGO
THE NEW YORK HOSPITAL, NEW YORK CITY
MASSACHUSETTS GENERAL HOSPITAL, BOSTON
CINCINNATI GENERAL HOSPITAL, OHIO
GRACE-NEW HAVEN COMMUNITY HOSPITAL, CONN.
UNIVERSITY OF MINNESOTA HOSPITALS, MINNEAPOLIS
KINGS COUNTY HOSPITAL CENTER, BROOKLYN, N. Y.
UNIVERSITY OF CHICAGO CLINICS, ILL.
UNIVERSITY OF CALIFORNIA HOSPITALS, SAN FRANCISCO
MOUNT SINAI HOSPITAL, NEW YORK CITY
PRESBYTERIAN-ST. LUKE'S HOSPITAL, CHICAGO, ILL.
UNIVERSITY HOSPITALS, CLEVELAND, OHIO
STRONG MEMORIAL-ROCHESTER MUNICIPAL HOSPITALS, N. Y.
MICHAEL REESE HOSPITAL, CHICAGO, ILL.
ALL OTHERS
100 % = 23,585

Figure 2

Communications

TEACHING EPIDEMIOLOGY TO MEDICAL STUDENTS

DR. BAL K. JERATH, M.B.B.S., M.P.H. (Calif.), M.Sc. Hyg. (Harvard)*

There is considerable challenge involved in teaching epidemiology to medical undergraduates in India. There are no standard text books suited to Indian needs, and tracks still have to be laid down both for techniques as well as contents as regards this subject. There is plenty of scope to modify the attitude of future physicians in India toward public health problems through this discipline. In contrast with other subjects of social and preventive medicine such as health, education, sociology, and sanitation, epidemiology has the advantage of being close to the clinical field in which interest already exists. However, the tools and techniques of epidemiology are quite removed from clinical sciences, and it is at such places as application of statistics and design in epidemiology that recourse has to be taken to devising interesting methods of teaching in order to maintain needed attention in the audience. The experiences of the author are being shared with the colleagues in this article.

Contributions of epidemiology.—The most important phase in teaching any subject and epidemiology in particular is to explain the reasons for teaching this subject and justification of the effort to be devoted to this field. The contributions to unraveling of etiology of various diseases since historical times including Snow's studies on cholera, Semmelweiss on discovery of contagion in puerperal sepsis without recourse to clinical investigations is recalled. Such historical discoveries through epidemiologic method narrated in a dramatic manner leave a keen and receptive attitude among students. Several sessions on uses of epidemiology are quite opportune. In a developing country like India where laboratory facilities for diagnosis are poor the use of epidemiological data as an aid in diagnosis is very important; e.g., in an outbreak of typhoid the early cases with strange symptoms are more likely to be typhoid than any unfamiliar disease. Incidentally, the needs for sound records and completeness of reporting are obvious, and they help the health authorities to forecast epidemics and plan ahead for control measures. Examples from recent studies on chronic diseases and diseases of unknown etiology such as cancer, diabetes, or malformations the epidemiological method helps to probe into causation and formulation of hypotheses for validation. Having stirred up interest and enthusiasm in the subject by quoting examples from current and past history the tackling up of subject matter can be taken up with advantage.

Seminars on basic knowledge.—Fundamental knowledge on methods of spread of a disease and interplay of host agent and environmental factors in various communicable diseases is a prerequisite to understanding advanced epidemiology. To this end groups of four students present different aspects of actual studies from literature on communicable diseases of local importance preferably. Studies

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on outbreaks classified according to mode of spread—e.g., oronasal route group, containing smallpox, measles, influenza; orofecal route group, containing diarrheas, dysenteries, infective hepatitis, are presented and discussed. The principles involved are synthesized from the discussions. Criticism is freely leveled against the studies, and the presenting teams defend the works wherever possible.

Latest researches.—It is always stimulating to discuss latest information and new findings on a particular disease. Cholera epidemiology has recently been studied in East Bengal,[1] and some new facts have been brought to light regarding association of alkalinity of ponds with endemicity of cholera. Such studies are presented in class seminars and discussions are held around different hypotheses for further investigations. This leads to interest in outside reading and developing a critical outlook.

Dramatizations of control procedures.—Another mechanism used is that of re-enactment of an epidemic of a communicable disease. An actual epidemic from literature is presented by a group of students in the classroom in a chronological sequence in three or four convenient parts. In the first part occurrence of first two cases is described, along with their symptoms. The names of the class are written out on slips of paper and put in a hat for draw. The name of "health officer" is pulled out of the hat and is appointed health authority to deal with the epidemic. Appropriate steps to be taken are described by the "health officer." Wherever the health officer fails to take the required steps the health officer hands over the office to a new candidate, whose name is again pulled out by lot. Thus all the necessary steps for control are discussed as the dummy exercise on the epidemic unfolds itself, and students learn by going through this mental experience.

Using audiovisual aids.—Still another method of bringing epidemic close to their experience is by using audiovisual aids. There are suitable films in the market such as "Invisible Care,"[2] a film on whooping cough epidemiology, another on "smallpox," and so on. Film strips can be actually designed and developed by any department and made to suit the contents aimed for discussion. Certain key questions are constructed around the epidemic and passed on mimiographed sheets. Answers to these questions are filled in after the class has witnessed the show. Careful observation is necessary for answering such questions. Application and use of epidemiologic principles in Indian situations are discussed. Thus, in an epidemic of whooping cough, in the absence of well equipped laboratories, tracing and preventing an epidemic through good reporting and recording systems and vital statistics are presented. The use of sound record[3]-keeping by hospitals and clinicians alike is demonstrated. The knowledge of seasonal occurrence and recurrence of epidemics of diphtheria, smallpox, measles, and whooping cough can be advantageously used and such demonstrations leave an impact on the minds of future physicians.

Trips to health departments.—A visit to the municipal health office for mortality and morbidity records is quite revealing. The limited use to which incomplete

[1] Drs. T. A. Cockburn, and J. A. Cassanos, "Epidemiology of Endemic Cholera." Pub. Health Rep., 73:791-803, 1960.

[2] "Invisible Care," a 16-mm. movie on epidemiology of whooping cough, available with National Education and Information Films Limited National House Appolo Bunder, Bombay.

records can be put, especially on cause of death, becomes obvious. Such visits include a write-up of their views and comments on mortality, morbidity, and birth records as they actually find them in the municipal office. They are encouraged to offer constructive suggestions.

Field surveys.—During their rural internship program the young physicians are engaged in field epidemiology. This includes actual collection of baseline data in any locale, making a map of the village, recording census data, and obtaining a demographic data on the population. The population is then surveyed for an easily recognizable disease such as scabies, trachoma, congenital and acquired deformities, etc. These are mapped and referred to different localities in the village on the map. Any association found between housing, religion, socio-economic status, and disease is discussed, and the importance of such investigations from research and etiological point of view explained. Besides demographic surveys, the use to which hospital data can be put and the questions that hospital data can answer are also presented. Hospital studies are inexpensive as compared with surveys and are quite valuable if the data are sound and accurate. Besides, the technique of designing epidemiological studies is taught.

Studies conducted by the students themselves create an awareness regarding health and disease problems of their country and are likely to be left with a healthy change in their attitude toward the field of public health. Such facts gathered locally can be presented to succeeding classes, and thus teaching of epidemiology is made a mutually profitable and a satisfying job.

The ingenuity of the teacher lies in reproducing epidemics as and when wanted and brought as close to an actual experience as possible.

Report

TRENDS IN MEDICAL EDUCATION IN THE WORLD

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On the occasion of the Inauguration of the Indian Association for the Advancement of Medical Education, it would be appropriate to review briefly the history of Medical Education, the present situation in some advanced countries, and the progress made in Medical Education in India to enable us to think of our needs for the present to meet our future responsibilities.

Historical Review Up to 1800 A.D.—In the ancient civilisations of Egypt, Babylonia, Mexico, and Peru, medicine was practised by the priests, and it was a curious blend of superstition, empiricism, and observation—the three fundamental strands which continue even today though varying in degree. Archeological relics do not give an indication of the methods of medical education. Although the other ancient civilisations have died out, the Oriental civilisation of the River Valleys of India and China have survived up to the present time, along with their systems of medicine. In the recorded History of India during the Post-Vedic Period (600 B.C.-200 A.D.) Medical Education was introduced in the Taxila and Nalanda Universities leading to the title of Prana Acharya and Prana Visharada. Restrictions over the practice of Kuvaidyas or quacks were imposed. A "Medical Oath" binding the student with rules of personal hygiene, prevention of transmission of infection and contamination to others, and moral behaviour and obligations to the Teacher and patients of both sexes was enforced. A series of Hospital system was developed in India by Rahula Sankrityayana (son of Buddha) for men, women, and animals—which was perpetuated by King Asoka in later years in great measure by extending the Hospital system throughout the Kingdom and abroad, the relics of which are still found in Ceylon and Nalanda. Medical Education in India afterward remained static; the ancient universities vanished, and with the changed political conditions Unani and the Western systems of medicine were introduced into the country.

In Greek and Roman medical literature, detailed information of the Medical Education of their times is available. In Greece, medical education was based more on experience than on book learning, practical training being acquired as an apprentice from a physician-father or a practitioner. The Hippocratic oath exemplifies the pupil-teacher relationship and the ethical standards expected of a physician for which he had the necessary training.

The first school of scientific medicine in medical times was established in Salerno by the fusion of the cultures of the Greek, Latin, Jew, and Arab. Students dissected animals and attended demonstrations. At the same time in China, medical education was on a relatively systematic footing during Sung Dynasty (960–1280) and later in the Mongol Dynasty (1280–1368). During the

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Ming Dynasty (1368–1644) the first medical school in China was established at Peking.

During the 12th century the students trained in Salerno opened schools in France, Spain, Portugal, and England, and most of them were closely aligned to theology and the clergy. The University of Montpelier was founded in 1181, and the other outstanding medieval seats of learning date from about the same period. The University of Paris was founded in 1110, Bologna in 1113, Oxford 1167, and Padua in 1222; all the medical men in these universities were clerics, and scholastic standards dominated medical education. The state of medicine was basically a repetition of Greek medicine combined with authority, reasoning, and dialectics. Two outstanding men of the period, Albertus Magnus and Roger Bacon, exerted considerable influence in turning men's minds toward scientific approach. Bacon stressed the importance of acquiring knowledge through original research, but he was far before his times.

The Renaissance (1400–1500) saw the greatness of the Italian Medical Schools at Padua, Bologna, and Pisa. Other universities in Holland, Sweden, and Switzerland also were popular during the period. Students from Oxford and Cambridge studied at the Continental Universities but took their M.D. degrees at their universities as directed by the parliament.

During the 16th century, the notable event in world medical education was the adoption of the system of licensure in England. In 1518 Thomas Linacre, after 12 years of training at an Italian University, founded the Royal College of Physicians under a charter from Henry VIII. Linacre established Chairs of Medicine at Oxford and Cambridge. John Caius, another advocate of continental approach to medicine in the century, brought back the teachings of Vesalius, Professor of Anatomy at Padua, and endowed fellowships and scholarships at Caius College of Medicine at Cambridge. The beginning of modern experimental period may be said to date from Paracelsus, who overthrew the absolute sovereignty of Hippocrates, Galen, and Avicenna.

In the 17th century the experimental method gave new life both to medicine and science. At the Padua University the great Englishman Harvey became the Professor of Anatomy, and with a thorough knowledge of anatomy made his far-reaching discovery of the circulation of blood and laid the foundations of modern physiology. Locke and Sydenham, one in theory and the other in practice, left their distinctive mark on medical education.

In the 18th century the most notable contribution to medical education was made in England. London, Edinburgh, Aberdeen, and Dublin came to be known as medical centres of learning. Guys and St. Thomas Hospitals gave the best formal teaching. Attendance at lectures of men like Huntur, Hewson, Cruikshank, Baillie, and Wilson enabled the students to present themselves for examination to the Corporation of Surgeons or the Society of Apothecaries. Those aspiring to be Physicians had to pass the licensure examination except in the case of Oxford and Cambridge graduates. In 1800, writes Dr. Charles Newman, the aim of medical education in England was to produce "a cultural and highly educated gentleman with, quite secondarily, an adequate knowledge of Medicine." Students began to find their way more to the French Schools where Laennec and Lauis were advocates of modern medicine. Later in the century, Germany attracted many young medical students to study the laboratory Sciences of

Physics, Chemistry, Pathology, Physiology and Bacteriology under Virchow, Helmholtz, Muller, Cohnhein, and Ludwig.

Modern medical education in United Kingdom from 1800 onward.—In the early part of the 19th century technology began to supplement wisdom. The outstanding gain in the century was the absorption of clinical science into medical education and "the recognition of physical signs and the resultant scientific inductive attitude to diagnosis." This educational change necessitated the establishment of organised hospital medical schools. "The students took to active part, worked rather than listened, were educated rather than instructed." In this century again there was the obsession that the aim of medical education was to train "a safe general practitioner."

The General Medical Council of Great Britain was established by the Medical Act of 1858, a hundred years ago with the following functions:

1. Supervision and regulation of standard of professional knowledge expected of medical students before qualification,
2. Registration of qualified medical men, and
3. To publish British pharmacopoeia.

There are 47 members of the General Medical Council appointed severally by the Crown, by the medical corporations, by universities having medical faculties, and directly by the medical practitioners of England and Scotland. The broad plan of the curriculum was laid down by the General Medical Council in 1867. A logical order of subjects was decided by the Medical Education Committee in 1869. This pattern persisted to the present day, with the addition of one specialisation after another in the later part of the 19th century. The concept of the "safe general practitioner" was responsible to these additions. Aclands logical order of "Pre-medical" "Pre-clinical" and "Clinical" had the greatest disadvantage that the student had the horizontal method of instruction without any correlation of each successive phase. The whole matter thus became one of syllabuses of useful knowledge, and examinations without any consideration of the aims of medical education. Reform of medical education became an absolute necessity, much more so, as by now, the age of preventive medicine dawned.

The cause of medical education in the world has been notably advanced by the various reports, such as "Report from the Select Committee on Medical Education" 1834, in which the views on medical education of many men of British medicine of that time were recorded; Earl of Selbourne Commission's report on "Advancement of higher education in London," Flexner's Report (U. S. A.) 1910; Sir George Newman's reports of 1918 and 1923; Sir William Goodenough's report on "Interdepartmental Committee on Medical Schools" 1944; the Fullbright Committee's third report; and the B. M. A. Medical Committee's Report. It was said of United Kingdom that no other country produced so many reports but acted upon none. Nevertheless, the effect was obviously there.

In the 20th century the aim of medical education in Great Britain has moved imperceptibly to turn out a "basic doctor" able to go on learning for himself and equipped for further training in any direction he may choose. This is exemplified in the statutory recognition of the Compulsory Preregistration year as an internee and the recognition that even general practice requires postgraduate study in the hospital. Dr. Charles Newman firmly advocated a forward step to

incorporate the study of health and disease in society outside hospitals for preparing for medicine of tomorrow and also to take the step to bring the university atmosphere to medical education.

Trends in United States.—The growth of medical education in United States may be divided into five periods:

1. The colonial and early federal period: During the colonial period out of 3600 doctors only 10 per cent were university graduates, mainly from Edinburgh, German and French Universities. Some were clergymen, who received instructions in both religion and medicine. New physicians developed as apprentices under the physician-preceptor. In 1765, the 1st medical college in United States of America was started by Morgan along with his friend William Shippen at Philadelphia. In 1813 the medical school at Yale was established. Other Universities like Columbia, Harvard, and Dartmouth, followed the example. The courses of study extended up to 7 years but later reduced to 4 years. The same pattern of English medical education continued in these universities with a little flavour of the Continental method. Medical graduates with M.B. degrees obtained M.D. after 2 years.

2. Nineteenth century: Owing to the western march of the population and on account of the military needs of the country there was a rush to train doctors and in the process the ideals of liberal education before taking to medical education were given up. Proprietory medical schools were established with profit motive. In 1821 the system of licensure was introduced in some states, to raise the standards as the number of apprentices practitioners without formal qualification increased to phenomenal proportions. The system of licensure spread to other states, and the unlicensed doctors had to appear for the state examinations. The American Medical Association was formed in 1847 with a view to raise standards of medical education on all fronts such as requirements for admission to medical schools and examination for licensure. In 1900 there were 160 medical schools.

3. Drive to raise the standards: 1880-1920: As early as 1870-80 new forces began to act on medical education in the United States. One of these forces was science. Koch, Pasteur, and Meister were performing miracles with laboratory sciences on the continent. The American physicians and the people were awakened. The establishment of the Johns Hopkins medical school at Baltimore in association with the university had a salutory effect on the morale of the American medical profession. The entrance requirement at Johns Hopkins School was a graduate degree, and the German ideal of scientific research was kept in view. With the formation of the Association of Medical Colleges and the Council on Medical Education and State Licensing Boards and the entry of the Philanthrophic foundation like Carnegie in the field of medical education and the publication of Flexner's report (1910), the death knell of the proprietary medical schools was sounded. The medical schools decreased from 160 in 1900 to 131 in 1910 and to 96 in 1955. By 1920, American medical colleges attained much prestige and status. Science was given the proper place in the education of the doctor, the free elective system was emphasised, and premedical requirements were extended to the graduate qualification. Today there are 78 full-fledged medical colleges with an enrolment strength of 28,748 pupils and with a physi-

cian output of 6,845 per annum. The physician: citizen ratio in United States is about 1:1000.

4. Period between the two world wars: During this period there was a genuine cry against science and too early specialisation. There were also arguments for a liberal education as pre-requisite for medical education to raise the status of the profession as well as to increase the professional competence.

5. Contemporary situation:

a) Pre-medical education: Dr. Alan Gregg of the Rockefeller foundation made a profound contribution to medical education by his forthright views. He was concerned more with the methods than with values of liberal education. Criticism against the liberal arts is making itself felt now.

b) Medical education: It is considered that liberal education should be felt not only in the pre-medical period but also in the school of medicine. Mention is being made of the "Widening Horizons in Medical Education" and increasing emphasis of "Social" and comprehensive medicine. The Joint Committee of the Associations of Medical Colleges in 1958 in their report stated:

"There are three major features of illness: physical, emotional and social. These are intimately interwoven in the pattern of disease and that they must be considered together rather than as separate entities. All these must be included in the curriculum if medical education is to provide the students with the knowledge and skill necessary to fulfil the aims of medicine."

c) Intern program: During the last five years there has been a great interest in the preceptorship programmes to learn the profession by taking up resident appointments with established physicians in hospitals.

d) Curriculum coordination: Curriculum is being liberalised and freed from the shackles of horizontal methods. Integration and correlation are introduced in education with a view to increase comprehension and to reduce the didactic lectures. The walls between departments are being broken. Functional relationship between the basic sciences and the clinical sciences are being emphasised. A number of medical schools have developed their integrated programmes and particular mention should be made of Western Reserve experiment.

e) Integration of pre-medical and medical studies: Medical education has become expensive, with increasing cost of medical care. The student entering medical school, after a liberal arts qualification at the age of 20 or 22, has to study for 4 years at a medical school, after which the internee and post-graduate programmes would continue for 3–4 years, and with the 2 years' compulsory military service could only settle down to practice at the age of 30. Now a number of medical colleges have integrated programmes. Particular mention may be made of Johns Hopkins experiment which is designed to ameliorate three major defects of the present education:

The undesirable length of time to train a physician,

The dichotomy which exists between the liberal arts and the medical sciences; and

The noticeable decline in the strength in the basic science departments of medical schools.

The last 2 years of the college education are therefore integrated at Johns Hopkins with medical education thus reducing two years of study which enables early entry into the profession.

The dramatic demonstration of Soviet Technological progress is likely to accelerate the introduction of the Johns Hopkins Plan widely. Immediate goals

of technical skill may, very likely, supercede the deferred goals of liberal education.

6. The recent trends in medical education in United States are as follows:

Reduction of lectures;

Increase in conferences, seminars and clinicopathological conferences and other types of small group discussions;

Increased interdepartmental cooperation, correlation of basic sciences amongst themselves and with clinical sciences,

Planning free time in the student schedule for electives and research.

Modern clinical clerkship,

Increasing experimentation in individual medical colleges,

Great emphasis on graduate training as internee and postgraduate education in both continuing education and specialty,

Integration of the last years of the college with the years in the medical schools, and

Reduction of examinations and emphasis on day-to-day assessment.

7. The aims of medical education in United States may be epitomised at present as follows:

The acquisition of basic professional knowledge;

The establishment of essential habits;

The attainment of clinical and social status essential for the utilization of professional knowledge;

The development of basic intellectual attitudes, ethics, and moral principles to command the confidence of the patients and the community in which he lives;

The maintenance of good health to take care of the community health later.

Recent trends in U.S.S.R.—In Russia at the time of revolution there were in all fifteen medical colleges with about 8,600 pupils on the rolls and with an annual output of 1300 doctors. These institutions were not distributed uniformly over the country. Within a few years after the revolution, 162 faculties or institutes were opened. It is stated that the real improvement in medical education took place after Stalin's historic speech at the 17th Congress of C.P.S.U. (B). From then onward improvement of instruction, provision of new teaching appliances, and real progress in higher medical education took place.

At the present time there are over 80 medical colleges, where tens of thousands of young men and women study. To enter a medical college, a matriculation certificate is required, and the candidates are admitted only on merit. All the students in Soviet medical colleges receive stipends, and hostel accommodation is provided for students who come from distant places. Till 1945 the length of the medical course was five years, after which it was extended to 6 years. Practical experience is emphasized. Each student is assigned every year a definite programme of work to be done in hospitals and clinics under the guidance of experienced specialists.

The medical student after the first 2 or 3 years of study has the option to specialise in internal medicine or pediatrics or public health. The rate of production of doctors could be noted from the fact that the number of physicians in the country in 1950 were twice as they were in 1946. Medicine is obviously a technology rather than a profession.

In 1934 the degrees of Doctor of Sciences and Candidate of Sciences were established. The physicians should possess the above post-graduate qualifications for consideration for faculty posts. The state also enables the doctors to specialise

in various branches of medicine such as general medicine, surgery, tuberculosis, eye etc. There are, at present, over eleven advanced training institutes for post-graduate studies.

At present there are 200,000 doctors and hundreds of thousands of intermediates called Feldshers.

The Academy of Medical Sciences of U.S.S.R. was founded in 1945, and research in basic and applied medical sciences is encouraged in institutes, hospitals, clinics, etc.

The Soviet Union's tremendous achievements in public health are said to be the evidence of their Scientific progress. With the recent technological advances in Soviet science, with space satellites, Russia has, to some extent, established pre-eminence in scientific achievement.

Trends in China.—New China with 600 million population has only 70,000 doctors trained in modern medicine. About 300,000 traditional practitioners of the ancient system of medicine are integrated with the modern doctors in the hospitals, clinics and in the community centres. These traditional doctors have been given training in public health and immunisation techniques. The Chinese People's Republic has encouraged the patriotic health campaign so that the two types of doctors work together. In China, as in Russia, the communist policy is to produce more doctors in a short time. The medical training, before the Chinese Republic came into existence, was of 6 years training on the Anglo-American pattern. The new government reduced it to 5 years. They also follow the Soviet plan by which some of the students take up specialities like internal medicine, or public health or pediatrics after 2 years' training. The medical colleges in China as in Russia are quite separate from the universities, showing their technological approach to medical education. They take more students into the colleges than they can properly hold. The proposals to raise the number of colleges from 35 to 80 had to be abandoned partly for lack of teachers, and so the existing medical colleges were expanded to take in 300–400 students each per year. The annual intake into all the medical colleges is now 8,500.

According to Fox and Yudkin, in Peking Medical College, there are about 2,300 students instead of 400. The same is the case with medical colleges at Shanghai, Canton, and other centres. These centres are stated to be becoming medical universities. Mass production of doctors to meet the needs of the people has been developed to technical perfection. Lecture classes have 200 students but the practical classes are said to be smaller in these colleges.

A Chinese student joins the medical college at the age of 17 after 6 years at primary school and 5 years at secondary school and after 6 years at primary school and 5 years at secondary school and after completing a state examination in physics, chemistry, sociology, Chinese literature, and political science. In Peking 44 per cent are stated to be women students.

Examinations: As in Russia the examinations do not dominate the students. 80 per cent are said to be orals and 20 per cent written.

Teachers: Selected young graduates are picked up for post-graduate work and and research, Peking Medical College is said to be of the same standing as the Johns Hopkins. It was built and supported by the Rockefeller Foundation.

The Academy of Medical Sciences of China serves the same purpose as the Soviet Academy of Medical Sciences. Medical research is itself planned and out-

lined at a higher level, by scientific planning committees. The Chinese endeavour to improve the low standard of health of their people is said to be admirable.

Medical Education on the European Continent.—1. Italy: No limitation whatsoever exists on the number of students who can enter the medical schools after they pass the qualifying examination. There is much of overcrowding and inadequate teaching staff. The first 3 years of medical course deal with basic sciences, and the last 3 years with clinical subjects. The medical schools form a part of the university, and the professors have the same standing as the other professors in the university.

2. Germany: All those students who pass the qualifying examination to enter the university are eligible to enter medical colleges in Germany. Hence, the number of admissions into the medical schools is not limited. The medical course is for 7½ years, with 2½ years pre-clinical, 3 years clinical and 2 years practical training in hospitals. Academic freedom exists, and the students are permitted to join the university and transfer to any other university during the course of the medical studies.

The advantages of more practical education are well realised and students help themselves with knowledge.

The World Trends In Medical Education.—The World Health Organisation expert committee on professional and technical education of medical and ancillary personnel met in their second session in December, 1952. They defined some of the fundamental concepts in medical education in relation to the Society, reviewed the functions of medical teaching institutions, the educational requirements of medical students and the detailed curriculum of professional education. They stressed the relationship between the basic and clinical sciences and the necessity for supervised experience (internship) after completion of formal course and also emphasised the importance of student's physical welfare, etc. They also considered the necessity for the creation of educational environment and the importance of proper selection and training of faculty members. The committee also recommended national cooperation and international collaboration with a view of promoting improved standards of medical education.

The first World Medical Education Conference was held in London in August, 1953, under the auspices of the World Medical Association with the collaboration of the W. H. O., the Council for International Organisation for medical sciences, and the international association of universities. They considered the requirements for entry into medical schools, the aims and content of the medical curriculum, the techniques and methods of medical education, and the importance of preventive and social medicine in the training of physicians. The proceedings of the conference are of monumental importance to the progress of medical education in the world.

The South East Asia Regional Office, W. H. O., in an analytical study of medical education in South East Asia during 1952-53 recommended the establishment of a national planning body a sort of medical man power commission in each country in the region. They also recommended the orientation of medical teaching from the predominantly individual and curative approach to a more community minded and a preventive one.

The Second World Conference on Medical Education was held in Chicago during the 1st week of September, 1959. "Medicine, a Life Long Study," was the

theme for the conference. Special emphasis was laid at this conference on medical education beyond medical school. The subject was discussed under the following items:

1. Basic clinical training for all doctors.
2. Advanced clinical training for a general and specialty practice.
3. Training for teaching and research.
4. Continuation medical education.

The conference was a great success. Many Indian educationists contributed to the deliberations, notably, Dr. A. L. Mudaliar and Dr. Khanolkar.

Trends in India.—Modern medical education in India started in 1822 in a medical school at Calcutta. Medical colleges at Calcutta and Madras were started in 1835. They were recognised by the Royal College of Surgeons since 1843. In the past 100 years medical education has developed till 1933 under the general supervision of the General Medical Council of United Kingdom. The university degrees were registered in the Register of the General Medical Council, which implied that the standard of medical education had reached the minimum level obtaining in Great Britain during that period.

The Medical Council of India was constituted in 1933 along the lines comparable with the functions of the General Medical Council, with the exception that the provincial councils maintained registers and took up disciplinary work. Its twofold responsibility was to maintain uniform minimum standards of university medical qualifications in India and to further the recognition of these qualifications outside the country. "Efficiency at home and honour abroad" was the watchward prescribed by Sir Fazali Hussain in his inaugural address to the Medical Council in 1933.

The Bhore Committee in 1946 went into the question of medical education amongst other health matters and recommended a 4½-year course of 1½-year pre-clinical and 3-year clinical course after intermediate in science qualification. The committee also recommended 1 year of compulsory internship after provisional registration on the lines suggested by the Goodenough Committee in Great Britain.

The Medical Council of India, during the quarter of a century of its eventful work, streamlined medical education in our country. Amongst others the following are the important reforms effected in medical education by the council:

1. Uniform minimum standard of qualifications in medicine;
2. Uniform curriculum was recommended by a committee for adoption by all the universities, social and preventive medicine was included in the training of the student at the preclinical, clinical and intern years;
3. Standard requirements of medical colleges with regard to staff, equipment, buildings for admission of 100 students were prescribed;
4. Qualifications for the teachers in the various subjects were recommended;
5. Recommendations on postgraduate medical education regarding nomenclature of the degrees, courses, and periods of students, examinations, recognition of training institutes, and teachers were forwarded to all universities;
6. Postgraduate medical education committee was constituted to prescribe standards for examinations, teaching and training requirements, and for inspection of facilities and examinations, etc.;
7. Inspection of medical colleges and examinations;

8. A planning committee was established to plan the medical manpower requirements of the country and to regulate the establishments of new medical colleges and expansion of the existing ones; (the number of medical colleges now is 57, and the annual admissions are 4,600. The number of doctors in the country now is 80,000, for a population of 367 millions);

9. The council recommended the exchange of teachers from one university to the other to improve methods of teaching;

10. The council always strove for better standards of remuneration for teachers and advocated whole-time teaching units;

11. The council recommended the establishment of boards of postgraduate medical education and research in each university to encourage research and postgraduate studies;

12. The council obtained recognition of the Indian qualifications on reciprocal basis by other countries.

The Medical Council under the 1933 Act has done much against many odds. Much credit goes to the stalwarts like Dr. B. C. Roy, Dr. Jivaraj Mehta, Dr. A. L. Mudaliar, and Dr. C. S. Patel, the president who guided the destinies of the council with dexterity and foresight during some of these eventful years.

The government of India organised a medical education conference in the fall of 1955 which considered the proceeding of the World Medical Education Conference recommendations with special reference to the country's needs and recommended major reforms in medical education in India.

This conference considered the question of selection of students, premedical studies, and entrance requirements, study and curriculum hours, examination and assessment of the students' progress, establishment of social and preventive and statistical departments, establishment of full-time units for each department, selection of teachers and conditions of their service, post mortem examinations and psychological medicine, and made recommendations. Many of these recommendations have been generally accepted but, unfortunately, are far from being implemented.

The 2nd Medical Education Conference convened by the Ministry of Health, New Delhi, recommended again the early establishment of full-time teaching units, increased scales of salaries to medical teachers for the encouragement of postgraduate medical education and research, and recommended measures to meet the inadequacy of teachers, especially in nonclinical subjects, such as extension of the age of retirement, employment of retired teachers, offering of fellowships for training in teaching, relaxation of conditions of appointment of qualified teachers, integrated scheme of fellowships for training abroad, with a recommendation to the universities to relax the domiciliary restrictions in the award of postgraduate degrees. The state governments and the universities have not implemented these except a few cases.

A conference of deans and principals of medical colleges was convened for the first time by the Ministry of Health in September, 1960. This conference considered the following problems:

1. The high cost of medical education, possible methods of economy, and financing of medical colleges.

2. Measures for obtaining an increasing number of teachers for the existing and future medical colleges now planned and maximum utilisation of existing facilities for increasing postgraduate training and financial assistance required for this purpose.

3. An evaluation of the existing curriculum in medical studies with a view to planning a coordinated programme of research for evolving suitable curriculum.
4. Discussions on the failure rates in the medical courses with a view to reducing the number of failures at present experienced.
5. Integration of premedical courses in the medical colleges.
6. Creation of a separate organisational wing for medical education and research.
7. Organisation of refresher courses for private practitioners.
8. Coordination between colleges and exchange of teachers and students.
9. Relations between the colleges and the Indian Medical Council.
10. Methods and means of stimulating research in medical colleges.
11. Criterion for selection for admission of students to medical colleges.
12. Strengthening of the teaching hospital units.

Subcommittees were formed for considering Item No. 1, Item No. 2, Items No. 3, 5 and 8, Item No. 4 and Item No. 11 separately. It was not considered necessary to form subcommittees in respect of Items 6, 7, 9, 10, and 12.

The subcommittee dealing with the high cost of medical education, possible methods of economy, and financing of medical colleges, recommended a reduction of Rs. 7 to 15 lakhs over the present cost of Rs. 80 lakhs or so per college. Some reduction in the cost of the students' education was also envisaged by printing and publishing cheaper editions in India, prescribing fewer textbooks, and by reducing the college fees.

The 2nd subcommittee considered the measures for obtaining an increasing number of teachers for the existing and future medical colleges and suggested a number of recommendations including increased emoluments for the teaching staff and increasing the postgraduate medical facilities in the country.

The 3rd subcommittee considered the curriculum, integration of pre-medical course in the medical colleges and coordination between the colleges, etc., and recommended that it was necessary to acquire information from the colleges on the changes effected for total teaching programme including of curriculum hours in order to plan future curriculum on sound lines. They have recommended the exchange of teachers and the necessity for coordination between the medical colleges. With regard to integration they have left it to the existing practice and wished to review after a period of 5 years to arrive at a decision.

The 4th subcommittee discussed on the failure rates in the medical courses with a view to reducing the number of failures at present experienced. They discussed the day to-day assessment of the student's progress, terminal examinations, university examinations, and made some very useful suggestions with regard to the type of examinations.

The 5th subcommittee considered the criteria for the selection for admission of students to medical colleges and observed that interview as well as the university marks should be taken into consideration and that 5 per cent of the candidates may be graduates in science.

The Conference also suggested the creation of a separate organisation for medical education and research in the directorate. The Conference also recommended that additional staff for research should be provided in each college who could also take part in the teaching programme of the department and that such experience be considered as equivalent to the teaching experience and that positive steps should be taken for stimulating research.

These recommendations are yet to be studied by the governments and the universities, and it is hoped that some advances will be made in the implementation of the various Conferences.

The Andhra Pradesh government organised a State Medical Education Conference in 1956 and soon after sanctioned a Council on Medical Education with principals of colleges, and superintendents of teaching hospitals in the state as members with the director of medical services as the chairman to meet twice a year to discuss and make recommendation for improvement in medical education. Many of the above suggestions have been put into practice in the colleges except the salary structure and the method of examinations.

There are many problems that the Indian Association for the Advancement of Medical Education has to consider, such as, medical manpower requirements of the country, optimum number of medical colleges, the training of various types of medical personnel for the needs of the country, the medium of instruction, experiments in medical education, curriculum reforms, postgraduate education, national examinations, etc.

With determination and dedication to the cause, the Indian Association for the Advancement of Medical Education will no doubt give a lead to the country in the field of medical education and training of the health professions, and contribute toward the attainment of higher standards in medical education, research, and the health of the nation.

ABSTRACTS FROM THE WORLD OF MEDICAL EDUCATION

ANGELA SANCHEZ-BARBUDO, PH.D.
Abstracts Editor

Preparation for Medicine as a Profession. JOHN R. ELLIS, M.D. The Manchester Medical Gazette, pp. 3–11, (Oct.), 1960.

Although the increase in medical knowledge has enforced specialization, a change in the quality of that knowledge has altered the physician's concept of disease, his mental attitude toward diagnosis and treatment having become more scientific. The practicing physician today has not to be a scientist, but he must be a "scientific doctor." Yet, since medicine has been advancing very fast in but one lifetime, there are now some doctors who are scientifically-minded and some who are not. However, the difference between them does not show very much in practice but lies rather in their attitude toward new knowledge and in their ability to assimilate it (the difference in attitude, the author notes, is not directed toward the patient but toward disease). If in the future the rapidly changing and increasing medical knowledge is to be applied effectively and safely to the patient, the doctor must have a scientific attitude. The problem for medical education is how to inculcate this attitude while maintaining the highest standard of clinical skill and the most humanitarian concern for the patient. The result of having at the same time clinicians who approach medicine in two different ways is that two different concepts of medicine are simultaneously presented to the students by their teachers, the methods of teaching differing as well. On the other hand, whereas changes in medical practices have been inevitable, changes in education have been restricted by the coexistence of old and new concepts.

It took quite a long time for British medical authorities to accept the fact that, in the age of specialization, general practice, as it was known before, has come to an end, and with it the apprenticeship training it has evolved. However, the General Medical Council did officially state in its Recommendations of May, 1957, that the aim of medical education is no longer to produce a finished doctor of any kind. This recognition means a very radical change, the full significance of which has not yet been appreciated. It means that medical education in the future, for family doctors as well as for specialists, will consist of two parts, undergraduate and postgraduate. It also signifies that the aim of medical education has now become first and foremost to *educate*, that is, to give the student not so much knowledge as the power to utilize it. Medical schools, therefore, need not search any more for an answer to the insoluble problem of how much factual data the student needs to know. Although he must know facts, his and his teachers' primary

purpose must be that he learns how to learn for himself. The student must, furthermore, acquire a scientific method of thought, that is, the power to reason and think critically; he must achieve competence in clinical method, that is, the techniques of obtaining information from patients; and he must gain an understanding of the responsibilities of a professional person. If these objectives are attained, he will surely have built up a foundation of knowledge, including empirical knowledge; gaps in it, as well as technical inadequacies, can be made good in the postgraduate period. It is pointed out, however, that the effective planning, executive, and frequent assessment of every stage of a real course of studies are quite beyond the capabilities of any Dean's staff or Curriculum Committee, and require that every medical school have a team for each stage of medical training working toward a comprehensive and feasible objective. The effective readaptation of medical education, in the author's view, would depend on three main factors: (1) a course of studies based on stages of learning together with relevant forms of assessment; (2) a more effective method of operating the new curriculum; and (3) a university atmosphere in which the student can develop as an individual with appropriate encouragement and guidance.

Clinical Teaching. ANTHONY R. ANSCOMBE, M.D. The Manchester Medical Gazette (Oct.), pp. 16–18, 1960.

After a brief survey of Britist methods of clinical teaching in the past, the author develops his personal ideas on what clinical instruction ought to be like in the future. The most important problem, as he sees it, will be *what* is to be taught rather than *how* it is to be taught. The amount of medical knowledge, he points out, is already too vast and diversified for even a proportion to be learned in the clinical course. Yet the final examinations, in their present form, set a premium on factual knowledge, this situation being worsened still by each new sub-specialty demanding a slice of the limited time available. Therefore, a completely new approach to clinical teaching is needed. Its aim should be to produce graduates with a sound knowledge of the general principles of medicine and the ability to reason from these. This objective can be attained better by the discussion than by the lecture method of teaching (unfortunately, teaching by discussion, in small groups, will be more costly, since it requires a large staff). Final examinations can be modified to give the candidate the best opportunity to express himself. They should consist of a dissertation chosen from a wide range of subjects; one written paper to assess factual knowledge covering all the branches of clinical medicine, and a short clinical *viva* in the three main subjects. A course of clinical medicine, in the author's view, stands or falls on the standard of the first year. He suggests, therefore, that the first 3 months should form an introductory course in which the elements of history-taking and physical examination are taught, and the natural history of disease is correlated with pathology. The introductory period, according to this plan, is completed by clinical work and a course in pathology. Lectures during this period should be kept at a minimum. Other features of the author's vision of effective clinical teaching, as applying to Manchester Medical School, are discussed in detail. In general, the point is stressed that every attempt should be made to keep the interest of the student as wide as possible (every month, he suggests, a lecture should be given on a non-medical subject, and be followed by discussion).

American Textbooks of Pathology. ESMOND R. LONG, M.D. Archives of Pathology, Vol. 70, No. 6, pp. 15–16 (Dec.), 1960.

The recent increment of American texts of pathology is contrasted with the scarcity of such works when the current authors were in medical school. Although since 1901 there has existed an *American Textbook of Pathology*, ably written by nineteen of the country's leading experts in special fields, general pathology was then built largely on the German model, and German texts prevailed among American medical students (the most popular being Professor Ernst Ziegler's *Lehrbuch der Allgemeinen Pathologie und der Pathologischen Anatomie*). Not until the late 20's of this century did a small number of American texts enjoy wider use, e.g., Mac Callum's of Columbia and Johns Hopkins, 1918; Karsner's of Western Reserve, 1926; and, above all, the pioneer *Textbook of Pathology* by Delafield and Prudden, of Columbia, which has gone through sixteen editions since it was first published in 1885. However, it should not be forgotten that long before any of these American texts, two other textbooks by American physicians had opened the field for American students and practitioners: the *Treatise on Pathological Anatomy* (1829), by the Philadelphia anatomist W. Edmonds Horner, and the *Elements of Pathological Anatomy* (1839), by the surgeon Samuel Gross of Cincinnati.

Group Practice in the United States. S. DAVID POMRINSE, M.D., and MARCUS S. GOLDSTEIN, Ph.D. Group Practice, Vol. 9, No. 11 (Nov.), 1960.

In 1946, the Public Health Service carried out the first comprehensive national survey of medical group practice in the U.S. (cf. Hund and Goldstein, *Medical Group Practice in the United States*, P.H.S., Pub. No. 77, 1951). Since then there has been a steady increase in the number of such groups and of the physicians involved, and many changes have taken place in their methods of organization and operation. The present survey (also by U.S. Public Health Service staff members) brings knowledge in this field up to date by studying in detail the data obtained in response to a mailed questionnaire on the actual number, size, and geographical distribution of such groups. With the support of several statistical charts, the conclusion is reached that, since 1946, there has been a tripling in the number of medical groups in the U.S., as well as in the number of group physicians. Rates of increase vary in different areas of the country, being highest in the South and on the West Coast. Most groups consist of three to five physicians, the smallest groups being also the youngest. A continuation and, perhaps, even an acceleration, of the present trend can be anticipated.

A Sociologist's Views on Patient Care. LEO W. SIMMONS. The American Journal of Psychiatry, Vol. 117, No. 5, pp. 385-392 (Nov.), 1960.

The author who had been fully engaged in anthropology and sociology at Yale University until he was invited by the School of Medicine as "consultant to psychiatry"—acknowledges his debt to American psychiatrists, who taught him, he believes, at least, five cardinal principles: (1) The uncanny uniqueness of every individual; (2) the concept of wholeness of the person with his illness; (3) a profound respect for subjective experiences as they relate to physical and personal welfare; (4) the underlying continuities in life experience, and (5) the scientific expediency of exercising restraints on personal blame in order to better understand individual behav-

ior. While praising medical hospital staffs for what they now offer for the health and welfare of potential patients, the great lag between what is actually done and what could be done is also emphasized by the author. Attention is called to the fact that lay dissatisfaction increases and is pressing hard for improvements which could come, and are bound to come, by means of a better application of the existing knowledge and skills. It is anticipated, however, that such progress in patient care will occur in the face of some opposition on the part of many potential patients, and the hope is expressed that a systematic study of the social factors involved may speed the orderly progress of hospital-patient relationships. There are, according to the sociologist's view, six broad changes in the social order that have some bearing on medical trends and staff-patient relationships: (1) population mobility (horizontal and vertical); (2) general lay sophistication; (3) commercialization of the professions: (4) shifts in age composition and disease prevalence in the population; (5) a trend away from a religious-philosophical orientation toward a scientific one; and (6) the growth and spread of organized pressure groups. The impact of such trends on the "new physician," on the hospital of tomorrow, and patient care of the future, will doubtless be great though difficult to measure now.

Medical Services and Medical Education in Papua and New Guinea. The Medical Journal of Australia, Vol. II, No. 27, pp. 1039–1040 (Dec. 31), 1960.

In Australia's program for the development of the Territory of Papua and New Guinea, an increasingly prominent place has been given to the health services. Among the most urgent task is the lifting of what has been called " the curtain of disease" which has been hampering so long the Territory's progress toward self-determination. This immense task, however, involving not only the provision of hospitals, doctors, and nurses but also some profound social changes, cannot be accomplished, it is pointed out, until the indigenous population itself is engaged in it. For this reason, an extensive training program is being developed with the ultimate goal to establish, to university standards, a medical college and teaching hospitals, together with nursing and ancillary medical services required to supply adequately the medical needs of the country. The establishment for medical practitioner training, the Papuan Medical College, is already on its way. A preliminary year was completed in 1959, and the first year proper has been initiated in 1960, as the first phase of the planned 6-year course of training. It is expected that, with each year, entrance standards will rise and that finally, before very long, a level comparable to that of other medical schools will be reached.

NEW BOOKS

KENNETH E. PENROD
Book Review Editor

Abstracts

Classics in Psychology. Edited by THORNE SHIPLEY. New York: Philosophical Library, 1961. 1336 pp. $20.00.

This book covers 36 selections, each by a different author. Some of these essays have never before been translated into English. In all the translations an attempt has been made to catch the spirit of the original text as well as its literal meaning. Hence, archaic and even Germanic construction has at all times been intentionally retained. This book is not intended as an anthology or a capsule. Rather, the author's purpose has not been to survey a whole field but rather to give a very small introduction to the mileposts. Every significant branch of psychology is touched upon. This is an historical investigation, meant to serve only as a short introduction to a large field.

Essential Hypertension, an International Symposium. Edited by K. D. BOCK and P. T. COTTIER. Berlin: Springer-Verlag, 1960. 386 pp.

This symposium, sponsored by Ciba, was held in Berne, June 7–10, 1960, and was chaired by Professor F. C. Reubi. There were 22 formal papers presented and discussed by several of the 38 participants representing several countries.

Essential Pathology. By ROGER D. BAKER. Baltimore: Williams & Wilkins Company, 1961. 636 pp. $9.50.

This book is a portrayal of disease, directed to the student who is preparing himself for practice or research. In the interest of brevity, normal structure and function are omitted. The subject matter of this book has been selected in proportion to the frequency and severity of disease. Material has been chosen to include only useful information, and the terminology has been kept simple. The book is based on the author's observations in the dissecting, autopsy, and operating rooms, the laboratories of surgical and experimental pathology, and in the wards and clinics of the hospital. It is designed to answer practical questions. The book is in two parts: Part I, Principles of Pathology or General Pathology (Chapters 1 to 13); and Part II, Diseases of Organ Systems or Special Pathology (Chapters 14 to 22).

Essentials of Neurology. By JOHN N. WALTON. Philadelphia: J. B. Lippincott Company, 1961. 399 pp. $6.75.

This book has been written to help the undergraduate or postgraduate student to learn the principles of neurological diagnosis and treatment. It will also assist the practicing physician. The first ten chapters of the book are devoted to a consideration of cardinal symptoms and signs of neurological disease, to the mechanism of their production, and the various pathologic changes which may produce these clinical manifestations. Mention is made of investigative methods in only sufficient detail to indicate to the student or practitioner the indications for employing these methods, their failings and their dangers, and the information which they are likely to divulge. The ensuing chapters contain brief descriptions of specific syndromes of nervous disease, taking into account the general principles previously stressed. Exhaustive descriptions of pathological changes and of differential diagnosis are omitted, and the reader will not find lists and tables of diseases and syndromes. The intention has been to make this a book which can be read by the student who wishes to obtain a composite picture of neurological illness,

but can also be used as reference if need be. Each chapter is concluded with a list of references. The book ends with a general review of therapeutic measures which are of value in the field of neurological medicine, but only those appropriate to general practice are considered fully.

Management of Obstetric Difficulties. By J. ROBERT WILLSON. 6th ed. St. Louis: C. V. Mosby Company, 1961. 663 pp. $16.50.

This book, like its predecessors, is designed to serve as a ready reference for practicing obstetricians and those in training rather than as a basic text for medical students. Much of the material of this edition has been rewritten. Outmoded methods for managing both normal pregnancy and the various complications have been replaced with newer and more effective diagnostic and treatment programs, most of which can be utilized in any doctor's office or properly equipped general hospital. The most important of these changes deal with the management of habitual abortion, particularly abortions resulting from incompetence of the cervical os, the management of septic abortion, the diagnosis and chemotherapeutic drugs, and management of complications such as diabetes and prediabetes, urinary tract disorders, the various forms of anemia, heart disease, nausea and vomiting, essential hypertension, and preeclampsia. The use of diuretic and hypotensive agents, ataraxic drugs, and other new preparations is also considered. A number of diagnostic procedures such as fetal electrocardiography, a fern test on cervical mucus, the salt overload test in toxemia, and others have been described and evaluated. Sixty-six new illustrations have been added and a number of old ones eliminated.

Surgery for Nurses. By JAMES MORONEY. 7th ed. Edinburgh & London: E. & S. Livingstone Ltd., 1961. (Available through Williams and Wilkins Company, Baltimore.) 762 pp. $7.50.

In undertaking a radical and thorough revision of the text of this book there has been considerable rearrangement, and many sections have been entirely rewritten, including those on the nurse's approach to the patient, sterilization, asepsis and theater technique, surgical ward dressings, burns, the surgery of the lungs, cardiac surgery, tracheostomy, and genito-urinary surgery. Considerable amendment has been made to chapters on infection and immunity, bacteriology, the breast, and the central nervous system. New sections have been written on oxygen therapy, surgical diathermy, and fluid administration, while the chapter on surgical shock has been deleted and replaced by one on acute circulatory failure so as to conform more closely to present thought and practice. Throughout the book a special effort has been made to stress and, as far as possible, to illustrate the fundamental principles of asepsis and to reflect the increasing anxiety which is felt about hospital infection. More than 125 new illustrations have been prepared for this edition.

The Association of American Physicians. Its First Seventy-Five Years. By JAMES HOWARD MEANS. New York: The Blakiston Division–McGraw-Hill Book Company, Inc., 1961. 295 pp. $10.00.

In writing this history the aim has been to discover to what extent the evolution of American medicine is exemplified in the Association's activities. The composition of the programs as to the nature of their content, practical or experimental, point of view, and the approach of contributors to their problems, and the persistence of interest in certain subjects has been scrutinized. The aim has been, not to spot every paper which was destined to have important significance later, but to indicate, in general, what kind of intellectual menu the Association was accustomed to feed upon. The character of the membership also has been studied, with respect both to fields of interest and to its division into full- and part-time people, or into practitioners, investigators, and teachers. This work is not merely a digest of the 73 volumes of the *Transactions*, but rather the effort has been made to reach the true significance of the Association both to itself and to the community—to characterize it

and discover what influence it has had, how this has been exerted, and to get perspective and depth. The attempt has been not to write a history in the usual sense, but a biography of a society.

Handbook of Surgery. Edited by JOHN L. WILSON and JOSEPH J. MCDONALD. Los Altos, California: Lange Medical Publications, 1960. 624 pp. $4.00.

The objective in preparing this pocket-size, paper-bound handbook has been to provide a concise summary of the essential features of the more common surgical disorders. An attempt has been made to include basic diagnostic information and detailed discussions of nonoperative management, including preoperative and postoperative care; but in most cases the details of operative technique have been omitted. Exceptions to this rule have been made in discussions of situations where the nonspecialist may need guidance in an emergency or in outlying areas where specialist assistance is not immediately available. New editions of this handbook are scheduled every 2 years making it possible to review each section and correct any disproportions or deficiencies which are found.

Orthopaedic Approaches: A Sterographic Manual. By JOHN J. JOYCE, III, and MICHAEL HARTY. Section 1: Lower Extremity—Reels 1 to 18. Baltimore: Williams and Wilkins Company, 1961. 75 pp. $28.00.

In concert with the recent efforts to depict anatomical relationships in three-dimensional photography, this book focuses on the lower extremity. The eighteen reels in 3-D color are attached to the inside of the front and back covers of the book. These reels can be studied by the individual using a hand projector or by a group using a suitable projector, screen and viewing glasses. Or, if necessary, they are reproducible in two-dimensional pictures. Reels consist of unretouched photographs of fresh cadaver material or amputation specimens to portray the exact operative findings. The dissections have been performed mainly as they are done at the operating table. An effort has been made to keep the labels sufficient in number for orientation only. The text, the line drawings, and the photographic illustrations serve to amplify the steroscopic views. The line drawings at times emphasize the essentials seen in the sterographic views; at other times they demonstrate features that would have otherwise been omitted—e.g., skin incisions. An attempt is made to emphasize limitations and danger points as well as the indications for each approach. The forthcoming companion volume, Section 2, will treat those aspects involving the spine and upper extremity.

Mental Health in the United States. A Fifty-Year History. By NINA RIDENOUR. Published for the Commonwealth Fund by Harvard University Press, Cambridge, 1961. 146 pp. $3.50.

Emphasis in this book has been on origins, early developments, and "firsts" in the mental health movement. The plan has been to devote most of the space to the beginnings of various facets of the movement, especially to those earlier in time, less well known, and about which information is less easily available. Then, the nearer to the present the story comes, the less space is given to the topic. The readers for whom this account is intended are those who already have some degree of concern about the subject and know at least something about it. More specifically, this is for the boards, staffs, volunteers, and members of mental health associations; for students in the medical, social and behavioral sciences; and for professional workers in mental health and related fields. The book consists of fourteen chapters beginning with the meeting of Clifford Beers with his first supporters in 1908.

Synopsis of Histology. By HENRY J. WERNER. New York: McGraw-Hill Book Company, Inc., 1961. 138 pp. $4.25.

This small paper-bound book presents a tripartite approach to the subject. First, the histocytological aspects in which the cell, its dividing capacity, its organoids, and its inclusions are presented. Second,

the classical concept of histology—tissues—is presented. Finally, to complete the picture, specific tissue arrangements—organology—is presented. This manual is not designed as a substitute for either the text or for current literature. It is intended rather (1) to facilitate the recognition of histological sections, (2) to highlight salient features of cells, tissue, and organs, and (3) to serve as a concise source of review in times of "emergencies."

Human Heredity. By JEAN ROSTAND. New York: Philosophical Library, Inc., 1961. 135 pp. $4.75.

This book has been translated from the French by Wade Baskin. Discussed in this small volume are the relation of heredity to environment, the nature of chromosomes, Mendelian characteristics, blood types and Rh factor, congenital defects, mutations, race, the inheritance of acquired characteristics, and the future of eugenics.

Soviet Psychology—A Symposium. Translated from the Russian by RALPH B. WINN. New York: Philosophical Library, Inc., 1961. 109 pp. $3.75.

The contributors to this symposium include: Hans Hiebsch, A. A. Smirnov, A. N. Leontiev, N. F. Posnanski, G. S. Kostiuk, and A. L. Shnirman. The translator of this book points out that the most interesting aspect of the book is the idea going through the entire series of articles—something to be taken *very* seriously—that one of the principal tasks of the school, from its beginning, is to locate and promote among students talent of any creative type, for it is never too early to encourage future scientists, inventors, artists, writers, or plain workers to do their best and to learn and think unselfishly.

Daniel Drake (1785-1852)—Pioneer Physician of the Midwest. By EMMET FIELD HORINE. Philadelphia: University of Pennsylvania Press, 1961. 412 pp. $6.00.

This is a definitive biography of one of the most famous of 19th century American physicians, also known as an author, scientist, civic leader, educator, editor, orator, and patriot. Son of a Kentucky pioneer farmer, a graduate of the University of Pennsylvania School of Medicine, he became a professor on the staff of the first medical faculty in the west, and founded in 1821 a medical college which is now the University of Cincinnati College of Medicine. He established also the forerunner of the present Cincinnati General Hospital. This volume will prove of great interest to all interested in medical history.

A Prelude to Medical History. By FELIX MARTI-IBANEZ. New York: MD Publications, Inc., 1961. 238 pp. $5.75.

This book is based on the lecture courses on the history of medicine given by the author at New York Medical College. The book reflects the author's life-long enthusiasm for this discipline, and reads like a historical novel. It will be of interest to all concerned with the history of medicine by virtue of its unique approach to the subject.

Books Received

Radioactive Substances. A translation from the French of the classical thesis presented to the Faculty of Sciences in Paris by the distinguished Nobel Prize winner, Marie Curie. New York: Philosophical Library, 1961. 94 pp. $2.75.

The Impact of the New Physics. By FRANK HINMAN. New York: Philosophical Library, Inc., 1961. 168 pp. $4.50.

Minister and Doctor Meet. By GRANGER E. WESTBERG. New York: Harper & Brothers, Publishers, 1961. 174 pp. $3.50.

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*Jacques, A. A., and Fuchs, V. H.: J. Louisiana M. Soc. 113:200, May, 1961.

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Cosa-Terrabon Pediatric Drops	**Terramycin** Pediatric Drops

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Cosa-Terrastatin for Oral Suspension	**Terrastatin** for Oral Suspension
Cosa-Terracydin® Capsules	**Terracydin**® Capsules

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MEDICAL EDUCATION NEWS

from the Medical Schools

Alabama

Dr. JOHN M. MCKIBBIN joined the staff in August as professor and chairman of the department of biochemistry. Dr. McKibbin comes to the Medical Center from the State University of New York Upstate Medical Center where he was professor of biochemistry. He began his teaching career as an instructor in nutrition at the Harvard Medical School and has served on the S.U.N.Y. Syracuse faculty for the past ten years.

Albany

Dr. CRAWFORD J. CAMPBELL, who heads the department of orthopedic surgery at the Albany Medical Center, has been promoted from associate professor to professor at the medical college.

Dr. WALTER J. FRIEDLANDER, former chief of the National Veterans Epilepsy Center at the Boston VA Hospital, is joining the Albany faculty as associate professor of neurology. He also has been named physician-in-charge of the electroencephalography laboratory at Albany Medical Center Hospital, where he will develop a clinical research program in epilepsy.

Arkansas

Dr. A. W. MCCULLOUGH, professor of anatomy, died July 19, at age 60. Dr. McCullough, who had been with the department of anatomy since 1939, came to Arkansas from the University of Kansas where he received his medical training.

Baylor

Dr. STEWART A. WALLACE, longtime chairman of the department of pathology, retired Aug. 1 from this position. Named to succeed him is Dr. ROBERT M. O'NEAL. Dr. O'Neal comes to Baylor from Washington University School of Medicine in St. Louis, where he was associate professor of pathology. In his new post, O'Neal will hold the rank of professor of pathology.

Dr. Wallace will continue on the faculty as a senior professor in the department of pathology.

Boston

Dr. CHESTER S. KEEFER, Boston University Professor of Medicine and staff member of the Massachusetts Memorial Hospitals and Evans Memorial Department of Clinical Research, has departed for Hong Kong as the China Medical Board of New York's delegate to the Golden Jubilee of the University of Hong Kong. Dr. Keefer, who will also serve as visiting professor at the University of Hong Kong for several weeks following the celebration, will tour medical schools in Manila and Taipei before going to the 50th anniversary congress and convocation in Hong Kong, Sept. 11-20.

A former associate professor at Peiping Union Medical College, where he taught in 1928-30, Dr. Keefer is a member of the China Medical Board of New York.

New members of the faculty include: Dr. ALEXANDER G. MATOLTSY of Miami, Fla., who has been named research professor of dermatology; Dr. GRANTLEY W. TAYLOR, named honorary professor of surgery; and Dr. HUDSON HOAGLAND, professor of biology and physiology in psychiatry.

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Entirely redesigned in a new, larger two-column typographic format, this handsome new edition is profusely illustrated with 70 additional photographs, drawings and charts which clarify the text matter.

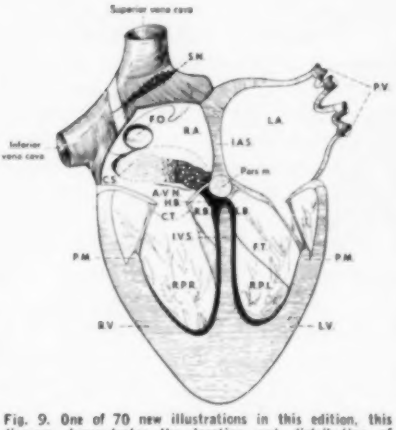

Fig. 9. One of 70 new illustrations in this edition, this diagram demonstrates the location and distribution of specialized nodal and conducting tissue in a human heart. Illustration is reproduced twice this size in the book.

This magnificent text is the most comprehensive one-volume work in the field of medical physiology. You'll find no sacrifice of detail or superficial oversimplification for the sake of brevity alone in this book. Its extensive bibliography is probably the most complete and current single source of reference material available.

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Dr. CORNELIUS F. STRITTMATTER has been appointed Odus M. Mull Professor of Biochemistry and chairman of the department of biochemistry. Formerly an assistant professor of biological chemistry at Harvard Medical School, he succeeds Dr. CAMILLO ARTOM as department chairman. Dr. Artom will continue on the medical school faculty as professor of biochemistry.

New promotions announced recently include Dr. JAMES F. MARTIN, from associate professor to professor of radiology, and Dr. ROBERT W. PRICHARD, from associate professor to professor of pathology.

U. of Chicago

Ground was broken recently for the $2,971,000 Philip D. Armour clinical research building on the campus of the University of Chicago. The six-story structure will connect Argonne Cancer Research Hospital, which is operated by the school for the Atomic Energy Commission, and Billings hospital.

Scheduled for completion next year, the new building will house 51 laboratories and the entire sub-basement will be devoted to radiation therapy and radiology research. Another basic project, to be carried on by a number of specialists from various disciplines, will be attempts to transplant organs for the diseased or damaged body structures.

Cincinnati

International approval of the training program in psychiatry at the University of Cincinnati Medical Center has come from England's Royal College of Physicians and Royal College of Surgeons. Cincinnati's department of psychiatry has been designated as a training center for fulfilling their requirements for examinations for certification in that medical specialty. This approval will be of special value to British Commonwealth physicians who come to Cincinnati for training as specialists in psychiatry.

The two colleges have a special board which gives examinations for certification in psychiatry after the necessary years of training in British centers and several U.S. centers, including UC's.

Columbia

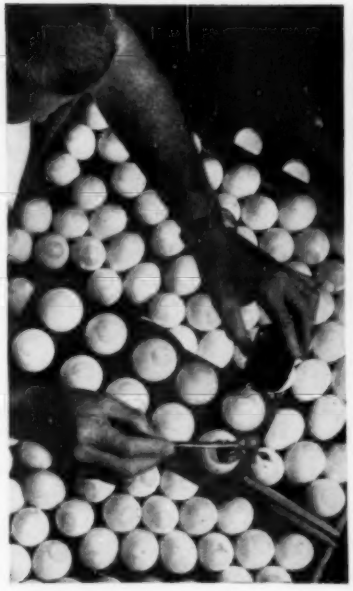
Columbia University College of Physicians and Surgeons is sponsoring a three day symposium on "Basic Problems in Neoplastic Disease" to be held on Mar. 12-14, 1962. This symposium will commemorate the 50th anniversary of the Institute of Cancer Research at Columbia University and the 10th anniversary of its affiliated clinical facility, the Francis Delafield Hospital.

The symposium is open without fee to all interested workers in this field. For details concerning the meeting, including application to attend sessions, write to the Institute for Cancer Research, Columbia University College of Physicians and Surgeons, 630 West 168th St., New York 32, N. Y.

Cornell

A $1,562,986 grant by the National Institute of Neurological Diseases and Blindness will establish a research center for the study of cerebral vascular diseases at the Bellevue Hospital Division of the Cornell University Medical College. To be allocated over a seven-year period, the purpose of the center is to expand a program which has been carried on during the past 15 years at the college under the direction of Dr. IRVING S. WRIGHT and other members of the staff.

The center represents a collaborative effort of the departments of medicine of the medical college and the Bellevue Hospital and the hospital's Neurological Services.



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1. J. Lab. & Clin. Med., 45:679, 1955. 2. J.A.M.A., 173:333, 1960.
3. New England J. Med., 263:1058, 1960.

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Albert Einstein

Dr. HARRY EAGLE has been appointed professor and chairman of the newly-created department of cell biology. Dr. Eagle has been chief of the laboratory of cell biology in the National Institute of Allergy and Infectious Diseases of the NIH. He joins the Einstein faculty after 25 years with the Public Health Service.

Indiana

The Indiana University School of Medicine and the state's LaRue D. Carter Memorial Hospital will establish a research center for the study of early childhood schizophrenia under a grant of $819,998 from the National Institute of Mental Health. This is the third major research grant to Indiana's medical school by the U.S. government within the past few weeks. The previously announced grants are for a heart research center and for studies of heart and lung stresses in space travel.

The center will be under the direction of the school's Dr. MARIAN K. DEMYER, assistant professor of psychiatry, and Dr. JOHN I. NURNBERGER, chairman of psychiatry and also director of the Institute of Psychiatric Research at the Medical Center. Dr. DONALD F. MOORE, Carter Hospital medical director and professor in psychiatry at the School of Medicine, will be closely associated with the project as will others from the medical school faculty and Carter staff.

Iowa

Two new clinical research facilities established with grants from the National Institutes of Health will make the State University of Iowa College of Medicine eligible to receive an estimated total of $4.4 million in federal funds to staff and operate the units during the next seven years, according to the school's dean, Dr. NORMAN B. NELSON.

First-year grants include $268,427 to support a Neurosensory Center and $140,000 to support a General (non-categorical) Clinical Research Center. The General Clinical Research Center will begin as a four-bed unit, expanding to a 20-bed unit as facilities permit. A full-time director of the unit will be appointed.

The Neurosensory Center, which will be a six-bed unit, will be devoted to integrated and refined studies of the functions of the nervous system and the eye. Dr. MAURICE VAN ALLEN, associate professor of neurology, will direct the Neurosensory Center, which will be a coordinated project of the departments of neurology and ophthalmology.

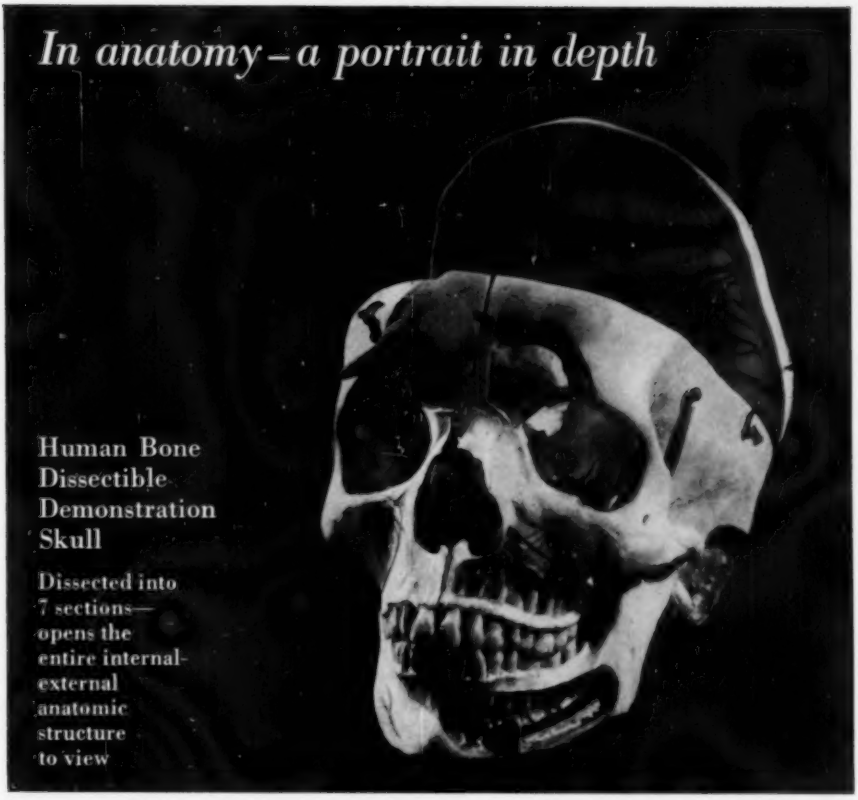
Johns Hopkins

Three members of the faculty were recently promoted to the rank of full professor. Dr. HENRY T. BAHNSON, who has been associated with the Johns Hopkins Medical Institutions since 1944, was appointed professor of surgery; Dr. LEON EISENBERG, who came to Johns Hopkins in 1953 as an instructor in psychiatry, was named professor of child psychiatry; and Dr. MANFRED M. MAYER, who joined Hopkins' School of Hygiene and Public Health in 1946 as assistant professor of bacteriology, was named professor of microbiology. He became associate professor of microbiology in the School of Hygiene in 1948 and since 1958 has held that rank in the School of Medicine.

Kentucky

Hungarian born Dr. TIHAMER ZOLTAN CSAKY will become professor and chairman of the department of pharmacology Dec. 1. Dr. Csaky holds the M.D. degree from the University of Budapest. He is now a U.S. citizen and since 1955 has been associate professor of pharmacology at the University of North Carolina School of Medicine.

In anatomy – a portrait in depth



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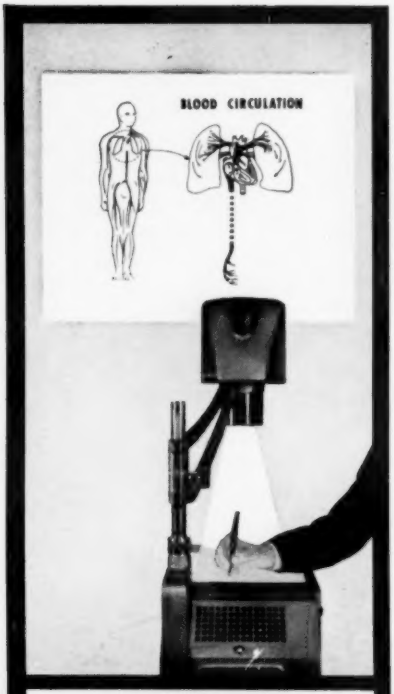

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Mayo Foundation

Nine associate professors on the faculty were recently given full professorial status. The promotions include: Dr. COLLIN S. MACCARTY, neurologic surgery; Dr. ALBERT FAULCONER, Jr., head of the section of anesthesiology; Dr. PAUL R. LIPSCOMB, orthopedic surgery; Dr. KINSEY M. SIMONTON, head of the section of otolaryngology and rhinology; Dr. JAMES W. DUSHANE, head of the section of pediatrics; Drs. LEWIS B. WOOLNER and DAVID C. DAHLIN, surgical pathology; Dr. DAVID G. PUGH, diagnostic roentgenology; and Dr. EARL C. ELKINS, head of the section of physical medicine and rehabilitation.

Meharry

Nearly $400,000 has been awarded to Meharry's Dr. HORACE M. FRAZIER by the National Institutes of Health for a five-year traineeship program in pathology. The first set of trainees will be recruited mainly from Meharry graduates who are currently doing internship, said Frazier. Assisting Dr. Frazier in the program are Dr. MICHAEL DAVIS and Dr. SISIR K. SEN.

Miami

Graduate education in basic and clinical science at the University of Miami School of Medicine will be expanded this fall by means of almost half a million dollars in grants provided to the medical school by the National Institutes of Health. The grants, available to equip laboratories, provide stipends and finance the research of graduate students, will expand research and teaching in psychiatry, biochemistry, dermatology, medicine, and physiology.

Minnesota

Three members of the Medical School faculty have accepted positions as heads of departments in other universities and

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will leave Minnesota before the 1961-62 academic year begins. They are Dr. E. B. BROWN, professor of physiology; Dr. HERMAN C. LICHSTEIN, professor of bacteriology; and Dr. ALAN P. THAL, associate professor of surgery.

Dr. Brown leaves Minnesota after 15 years to become head of the department of physiology at the University of Kansas. Dr. Lichstein, who has been on the faculty since 1950, will join the University of Cincinnati medical faculty as professor and head of the department of microbiology. Dr. Thal, who was at Minnesota for nine years, was named professor and head of the department of surgery at Wayne State's Medical School.

Missouri

Dr. MILTON D. OVERHOLSER, professor of anatomy and chairman of the department, will spend the coming academic year as visiting professor of anatomy at the University of Damascus in Syria under the sponsorship and with the support of the American Friends of the Middle East, Inc. Under the appointment he will serve as guest lecturer to medical students and resident physicians and will assist in the graduate program in anatomy.

Dr. WILLIAM D. MAYER began his duties as assistant dean in charge of student affairs July 1. He was formerly on the faculty at the University of Rochester School of Medicine and Dentistry. He will also serve as an assistant professor of pathology under the Medical Center appointment.

North Carolina

A $1,568,435 grant has been made to the School of Medicine by the National Heart Institute of the Public Health Service for the establishment of a comprehensive center for the study of hemorrhage and thrombosis. Funds will be used over a seven and a half-year period to support a three-bed clinical research unit in the North Carolina Memorial Hospital and to strengthen the laboratory work in the department of pathology.

Promotions to full professor recently went to Dr. CHARLES E. FLOWERS, obstetrics and gynecology; Dr. CHARLES D. VAN CLEAVE, anatomy; Dr. COLIN G. THOMAS, surgery; and Dr. CARL W. GOTTSCHALK, medicine and physiology. Dr. Gottschalk is the recipient of the American Heart Association Career Investigatorship.

North Dakota

Dr. VICTOR SZYRYNSKI has accepted an appointment with the School of Medicine as professor and head of psychiatry and associate professor of neurology. He will be transferred to Grand Forks in the Fall from his present position of Director of the State Psychiatric Clinic in Bismarck. Dr. Szyrynski will remain as Consultant in Psychiatry to the State Department of Health, closely cooperating with the Mental Health Authority and will be available in a consulting capacity to the other agencies.

Pennsylvania

A Cardiovascular Clinical Research Center will be established in the Hospital of the University of Pennsylvania, the first phase of the clinical program to be initiated this fall. The new Center, made possible by a $1.9 million seven-year grant from the Public Health Service, will make special clinical ward and laboratory facilities available for research on diseases of the heart and blood vessels. Dr. CALVIN F. KAY, associate professor of medicine at the School of Medicine, is director of the new Center. Dr. JOHN HELWIG Jr., associate in medicine, is associate director.

Completion of the cardiovascular facilities is expected within a year.

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Pittsburgh

A special medical research facility will be established within the next year in the expanded Presbyterian-University Hospital. The new 14-bed unit is being made possible by an initial grant of $450,000 to the university by the Division of General Medical Sciences of the NIH. Dr. JACK D. MYERS, professor and chairman of the department of medicine, will serve as interim director of the program until a full-time director is appointed. The purpose of the new unit is "to provide a facility in which patients who have diseases requiring special study or research are hospitalized," said Dr. Myers.

Funds from the grant will be used to remodel an area in the hospital and for new equipment and operating expenses.

Seton Hall

Dr. KENNETH JUDY has been named professor and acting chairman of the department of surgery. Dr. Judy, who has been associated with the medical school since 1957, will fill the vacancy created by the retirement of Dr. EARL J. HALLIGAN.

Stanford

Dr. DANIEL E. O'KEEFE, until this summer chief of the social service department of the 500-bed clinical center at the NIH, is chief of the new division of clinical social work in the Stanford University School of Medicine. The division, according to Dean ROBERT H. ALWAY, is the first in the country with the aim of providing social work participation in all appropriate areas of the medical curriculum.

The new division will develop educational programs which stress the importance of social and emotional factors in the care of patients. Its work is expected to fit in with the emphasis on behavioral sciences in the new curriculum of the medical school.

In addition to serving as chief of the division, Dr. O'Keefe holds the rank of associate professor.

S.U.N.Y (Brooklyn)

Dr. BERTRAM E. BROMBERG, an alumnus of the Medical Center and a specialist in plastic surgery, has joined the staff as clinical associate professor of surgery. Dr. Bromberg has held teaching appointments at Kings County Hospital, Bellevue Hospital, New York University Postgraduate School of Medicine, and the Bronx Veterans Hospital.

Dr. CHANDLER MCC. BROOKS, chairman of the physiology department and director of the Graduate Educational Program at the Downstate Medical Center, has been granted a year's leave of absence to serve, from Sept. 1961 through Feb. 1962, as visiting professor at the medical schools of the Universities of Tokyo and Kobe, Japan, under the sponsorship of the China Medical Board of New York. During this period he will also visit other medical schools in Japan, Formosa, Hong Kong, Manila, Bangkok, Rangoon, and Singapore, lecturing and discussing matters of educational and scientific interest with the staffs. Following this, Dr. Brooks will work for three months with Sir John C. Eccles at the National University of Australia at Canberra on problems relating to central nervous system function. He is expected to return to the U.S. through India, the Middle East, and Europe, visiting other schools concerned with medical and graduate education.

The Educational Program of the Downstate Medical Center is offering a two-year program of research training in psychiatry leading to the degree of Doctor of Medical Science. The program is open to M.D.'s who have completed

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Editor-in-Chief of the Medical Newsmagazine, MD; Professor and Chairman, Department of the History of Medicine, New York Medical College

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three years of residency training in psychiatry. Candidates who have completed two years of residency will also be accepted. Each candidate accepted into the program will be granted a fellowship of $6,000 for the first post-residency year and $7,000 for the second year. Three year candidates will receive $7,100 for the final residency year. Applications for the academic year beginning Sept., 1962 should be submitted before Feb. 1, 1962. Information may be obtained by writing to the Office of Admissions, Downstate Medical Center, 450 Clarkson Ave., Brooklyn 3, N. Y.

Tennessee

The College of Medicine announced recently that it will develop an honors program soon for gifted students. Under the new program, it will be possible for a student who is especially interested in a specific field to be given more advanced training in that field in addition to his regular training. Honors program students may also have the opportunity of doing independent research under faculty guidance. The new program, when developed, will be limited to juniors and seniors.

Dr. FRANK L. ROBERTS, associate dean of the college, has been appointed to develop the program. He recently returned from a two-year stay at the University of Shiraz in Iran.

West Virginia

The School of Medicine has upped its enrollment for the academic year 1961-62 to sixty students. This represents an increase from the previous high of 47 students per class and is the maximum number for which the present facilities were planned. Included in the 60 are 7 non-residents of the state, marking the first time such students have been admitted to the school.

Wisconsin

The Medical School will establish an epilepsy research center under provision of a grant of $1,360,398 from the NIH. The center will be under the direction of Dr. FRANCIS M. FORSTER, professor and chairman of the department of neurology. Dr. Forster, former dean of the Georgetown University School of Medicine, came to Wisconsin in 1958.

Yale

Dr. DOROTHY M. HORSTMANN has attained the distinction of being the first woman ever to be named a full professor at Yale. On the faculty since 1943, Dr. Horstmann was appointed professor of epidemiology and pediatrics. Dr. Horstmann, whose research on polio has been carried on in clinics and laboratories and in field investigations around the world, was selected in 1959 by the World Health Organiation to go to Russia and evaluate the mass vaccination program with live poliovirus vaccine of the type developed by Dr. Albert Sabin.

Dr. EDWARD A. ADELBERG, former chairman of the bacteriology department at the University of California, has been appointed professor of microbiology and chairman of the department. He will assume his new post with the opening of the semester this fall.

Three surgeons on the Yale faculty have been awarded full professorial rank. The promotions include Dr. WILLIAM W. L. GLENN, Dr. MARK A. HAYES, and Dr. JOHN M. MORRIS.

Dr. Glenn, who specializes in cardiac surgery, heads a surgical team at the Yale-New Haven Medical Center responsible for developing techniques for repairing congenital defects in the heart. Dr. Hayes, a specialist in cancer surgery, is in charge of the Tumor Clinic and also directs research at Yale on cancer and surgery. Dr. Morris is a surgeon who has specialized in the field of gynecology.

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from the National Institutes of Health

Establishment of New Research Career Award Program Announced

A Research Career Award Program has been established by the National Institutes of Health to provide increased numbers of stable career opportunities for scientists of superior potential and capability in the fields related to health.

The new program includes two types of awards: Research Career Awards, to finance additional stable positions for experienced investigators who are continuing to develop in productive careers of independent research and teaching; and Research Career Development Awards for young investigators who desire experience and further training in a productive research environment, as well as for scientists undertaking independent research who need further experience to qualify for senior positions.

The action merges and modifies the Career Research Professorship, Senior Fellowship Grant, and Special Fellowship Grant programs.

While the awards will primarily affect colleges, universities, and their departments, nomination may be made by any public or private nonprofit institution engaged in research in the sciences related to health.

Each award recipient will be directly responsible to his institution, and his status, title and privileges will be determined by the institution according to its established policies. In any year a maximum of four applications for Research Career Awards will be accepted from an institution, while there is no limitation on the number of applications for Research Career Development Awards.

A candidate for the Research Career Development Award must have had at least three years of relevant research or professional experience following the doctoral degree, and must have demonstrated promise for a career in independent research. These awards may be made for initial periods of five years and may be renewed upon adequate justification to provide a total period of support of not more than ten years.

Research Career Award candidates must have demonstrated an ability to pursue careers in independent research, and the research must have won the respect of scientific leaders in the field. The awards are made in five-year increments with the intention of continuing support for the full career of the investigator. Two factors will be considered in providing continued support:

(1) continued performance under standards set by the institution for scientists with substantial responsibilities for research and research training, and
(2) the institution and the scientists wish to have the award continued.

Complete information on these programs is available upon request.

New Grants Program Provides General Research Support Funds

A new General Research Support Grant Program for research and research training in public or nonprofit

NOTE: Readers desiring copies of publications mentioned in this section of *J. Med. Educ.*, may, unless otherwise noted, obtain them as well as additional information on any subject reported herein, by addressing their requests to the Office of Research Information, Room 115, Bldg. T-19, National Institutes of Health, Bethesda 14, Md.

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The illustrious work and teaching achievements of Dr. Kampmeier are readily reflected in this outstanding textbook. Directed at the second-year student of medicine, the book is designed to provide diagnostic skills that can be depended upon in a full life of clinical practice. Highlighted all through the book are valuable contrasts of the normal and the abnormal. In general, each anatomical region has two chapters, one on normal findings followed by one on the abnormal. This long-needed teaching device vivifies the student's impressions.

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By RAYMOND H. GOODALE, M.D., Pathologist, Worcester Hahnemann Hospital. 782 pages, 105 illustrations, 6 in color. *Fourth Edition.* $8.75.

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universities, hospitals, laboratories, and other institutions has been announced. Initially, institutions which may establish eligibility to receive general research grants are schools of medicine, dentistry, osteopathy and public health.

A principal feature of the program is that it gives recipient institutions greater freedom in determining the specific uses of the funds than is given with other kinds of Public Health Service grants. The new program will augment existing PHS grant programs, and is based upon Public Law 86-798, Sept. 15, 1960. During earlier stages of development it was referred to informally as the "institutional research grant program."

General Research Support grants may be used only for the *direct* costs of research and research training. It is expected that any institutional funds formerly devoted to research and research training which may be released by use of the General Research Support grant will continue to be used for such direct costs. However, an amount equivalent to 15 per cent of the grant will be added to the grant for support of the indirect costs of research and research training carried out by the recipient institution. The grants may not be used for the costs of new construction, alteration, or renovation.

Any inquiries should be directed to the Division of General Medical Sciences, National Institutes of Health, Bethesda 14, Md.

New Rules Announced Covering Use of Conference Grant Funds

A revised policy governing support for meetings of scientific organizations has been developed by the National Institutes of Health.

Under the new rules, applications for conference grants must contain more detailed budget information than is required for a research grant. Funds may be used for salaries in proportion to time spent directly on the conference; for actual living expenses of guest speakers; for conference supplies and arrangements, publication costs of conference proceedings and special papers, and for transportation (foreign travel requires special approval).

Funds will not be allowed for purchase of equipment, payment of honoraria or consultants' fees, entertainment charges, payment to Federal employees, or dues to organizations. No allowance for indirect costs will be provided. No transfer of funds between budget items will be permitted once the grant is made.

Copies of the new policy statement are available upon request.

NIH Analysis Indicates Gains in Ph.D. Production

An enrollment upsurge in the biological sciences, now under way in U. S. colleges and universities, resulted in a 16 per cent increase in graduate enrollment in the basic medical sciences during the 1959-60 academic year. Showing the greatest growth of all the sciences was mathematics with a 20 per cent increase. The number of graduate students in psychology rose by 15 per cent.

Based on data collected by the HEW Office of Education from the 80 U. S. colleges and universities which awarded 91 per cent of all doctoral degrees in the U. S. in 1959-60, a special analysis recently issued by the NIH Office of Program Planning, "Trends in Graduate Enrollment and Ph.D. Output in Selected Science Fields at 80 Leading Schools," reveals the above facts among many others of interest to educators and others concerned with an adequate supply of scientific manpower.

The report points out that although

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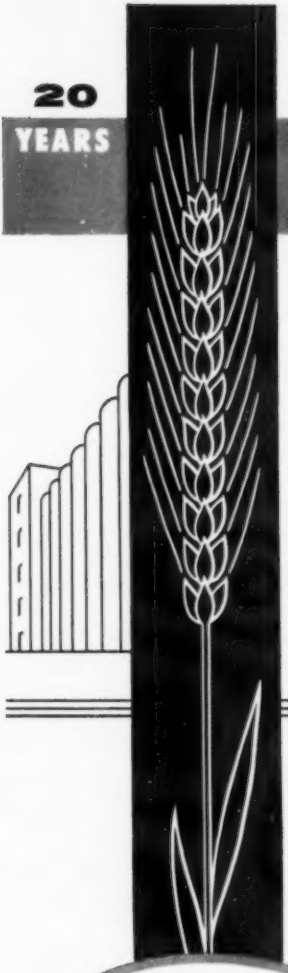

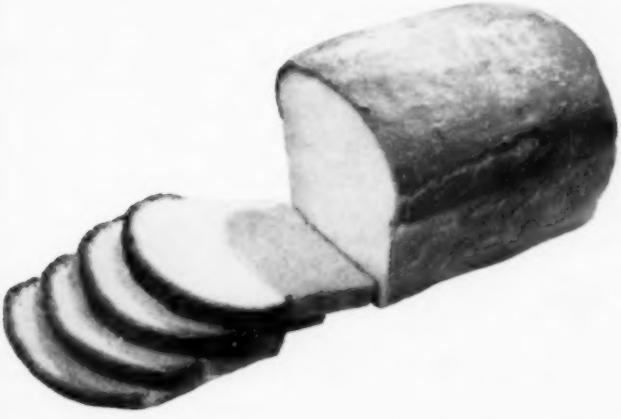

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the high rate of percentage growth in graduate enrollments seems to present a promising picture insofar as future Ph.D. output is concerned, the lead time between enrollment and actual attainment of the doctorate, the significant number of students who terminate their training at the master's level, and attrition, prevent an automatic correlation of the two. Even so, the 80 schools involved in the survey anticipate a sharp upturn in the Ph.D. output in the current year, and at the present rate of increase, by 1970 the number of Ph.D's awarded may range from 2,000 to 2,500 in the biosciences alone, as contrasted to 1,133 awarded in 1960.

The report, also referred to as "Resources Analysis Memo No. 3," in a section on Federal Fellowship Support, highlights the role of NIH in providing support for students in the biosciences, particularly in those disciplines closest to medical research: "Nearly 90 per cent of the fellowship-type assistance in the basic medical sciences is provided by NIH fellowship and training grants."

Copies on the 13-page report may be obtained upon request. Ask for "Resources Analysis Memo No. 3."

Two New NIH Training Films Now Available

"Eaton Agent Pneumonia" and "Germfree Animals in Medical Research," are the titles of two new training films prepared at NIH and now available for loan to medical schools and other appropriate audiences.

Both of the films, on 16 mm. color film, with sound, were produced by the National Institute of Allergy and Infectious Diseases.

The 19 minute film, "Germfree Animals in Medical Research" shows the kinds of equipment necessary to carry on germfree research and demonstrates the usefulness of germfree animals as research tools. Techniques of studies in host-parasite relationship in the absence of enteric bacteria; serologic studies of bacterium; investigation of the behavior of viruses in the absence of bacteria, and other studies and techniques are demonstrated.

The 22-minute film, "Eaton Agent Pneumonia," depicts studies which confirmed the role of the Eaton agent in primary atypical pneumonia, describing the disease as it appeared in Marine recruits, the therapy studies proving the value of tetracycline treatment, and the confirmatory investigations in prisoner volunteers. It was produced in cooperation with the Navy.

Both films are available on loan from the Communicable Disease Center, PHS, Atlanta, Georgia. Requests for loans should specify a preferred date and

Wyeth Pediatric Residency Fellowships . . .

Announcing

The Fifth Program of Grants

Applications are invited from eligible interns and young physicians who wish to be considered in the fifth program of Wyeth pediatric residency fellowships.

These fellowships will take effect on July 1, 1962. Applications must be in the hands of the Selection Committee by December 4, 1961.

Awards are made annually to selected applicants who aspire to specialization in pediatrics but for whom it would be financially difficult to undertake the residency training required for Board certification. Each grant provides $2400 yearly for two years of residency in a hospital accredited by the Residency Review Committee of the Council on Medical Education and Hospitals of the American Medical Association, the American Board of Pediatrics and the American Academy of Pediatrics.

Applicants must be citizens of the United States or Canada. Awards are limited to interns, to young physicians who have recently completed internships, to physicians coming out of the armed services or U.S. Public Health Service, and to research Fellows. Those who have already started pediatric residency training are ineligible. Awards are made directly to fellowship recipients, and do not replace the stipends normally paid to residents by the institutions.

Wyeth plays no part in the selection of recipients. Awards are made according to recommendations of the Selection Committee, composed of distinguished physicians in active pediatric service. Requests for application or further information should be addressed to the committee chairman: Philip S. Barba, M.D., School of Medicine, University of Pennsylvania, Philadelphia 4, Pa.

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two alternates, and should reach CDC at least two weeks prior to preferred showing date. Loans are for short periods, not to exceed one week. Requests for film loans should be directed only to the Communicable Disease Center, Atlanta 22, Georgia, Attention: Audiovisual.

Names in the News

Dr. JOHN F. SHERMAN has been appointed Associate Director for Extramural Research, National Institute of Neurological Diseases and Blindness. Dr. Sherman moves up from his former position as Deputy Chief of Extramural Programs, National Institute of Arthritis and Metabolic Diseases, a post he has held since 1956. In his new position he will be responsible for the direction of the research and training grant programs of the Institute, serving also in a major advisory role to Dr. Richard L. Masland, NINDB director, on the Institute's total program.

ELLEN J. WALSH has been appointed Chief of the Social Service Department, Clinical Center, NIH. She succeeded Dr. DANIEL E. O'KEEFE, who retired from the PHS Commissioned Corps June 30 to become Director of the Division of Clinical Social Work at Stanford's School of Medicine.

Dr. HARVEY A. ITANO, Laboratory of Pathology and Histochemistry, National Institute of Arthritis and Metabolic Diseases, is now on a one-year assignment as visiting scientist at the Institute for Protein Research, Osaka University, Osaka, Japan.

Items of Current Interest

New Medical School Appoints Colorado Educator as Dean

Dr. REGINALD H. FITZ, associate dean and associate professor of medicine at the University of Colorado School of Medicine, has been named dean of the new two-year School of Medicine at the University of New Mexico.

DR. FITZ

The appointment was announced by Dr. Tom L. Popejoy, UNM president, who said that because of the meaning of a two-year medical school to the future health of the state, he considers this appointment "one of the most important of the year."

Dr. Fitz will start laying the groundwork this fall by consulting administrators, including a national advisory committee, for the best ideas on medical schools "starting from scratch." His initial duties will be three-fold, Popejoy said. He will plan the educational curriculum, supervise the construction of new buildings, and recruit a competent faculty.

While the two-year school of basic medical sciences will primarily serve New Mexicans, it will also provide educational opportunities for students from neighboring states that do not have medical school facilities. The last session of the State Legislature ap-

Teaching and Learning in Medical School

Edited by George E. Miller, M.D., Director of Research in Medical Education and Professor of Medicine, University of Illinois, College of Medicine, Chicago. This is the first reference work on teaching and learning designed specifically for medical educators. Emphasizing what the student gets from education, it describes in terms of basic theory the strengths and weaknesses of familiar and less-known techniques. It hopes to provide re-examination of many educational practices that have become habits in medical schools. The authors examine the weaknesses of some of these traditional methods, suggest ways in which others could be made more effective, and point out some useful principles and practices that have not yet been widely incorporated in medical education.

Each of the book's four sections is intended to amplify one of the factors influencing the climate for and quality of learning. The first section is devoted to the Medical Student, the uncertain process by which he is selected, and the impact of intellectual and non-intellectual factors on his development. The remaining three sections discuss: the Process of Learning; the Tools of Education; the Evaluation of Learning. Throughout, the authors insist that "the only purpose to be served by teaching is to make individual learning more efficient and more effective."

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proved the establishment of the two-year school. The Kellogg Foundation has already made a grant of $1,082,000, half of which is due to go for capital outlay.

Dr. Fitz attended undergraduate college and medical school at Harvard University where he received his M.D. degree in 1945. He was resident in medicine at the University of Colorado from 1948 to 1950, where he began his teaching career as an instructor in medicine. He was appointed assistant dean in 1957 and later was promoted to associate dean. He was alternate chief and then chief of medicine at the Denver General Hospital from 1950 to 1957.

Dr. Fitz' major interests have been in clinical aspects of infectious diseases and in the field of medical education.

MEND News

Four medical schools will join the MEND program on Oct. 1, raising to 86 the total affiliated. The newcomers are the Chicago Medical School, the Universities of North Dakota and Oregon, and Stanford University.

MEND symposia for the academic year 1961-62 are scheduled as follows:

Nov. 29-Dec. 1, 1961—"Pathology of Trauma" at the Armed Forces Institute of Pathology, Washington, D.C.

Jan. 8-12, 1962—"Lectures in Aerospace Medicine" at the USAF School of Aerospace Medicine, Brooks AFB, San Antonio, Texas.

April 4-6, 1962—"Preventive Medicine and the Control of Infectious Disease in Emergencies" at the Communicable Disease Center, Atlanta, Ga., or at the Public Health Service, Washington, D.C.

May 14-16, 1962—"Nutrition in Disaster" at the U.S. Army Medical Research and Nutrition Laboratory, Fitzsimons General Hospital, Denver, Colo.

Papers Invited for TB Meeting

The American Thoracic Society invites submission of abstracts of papers relating to the general field of tuberculosis and other respiratory diseases for presentation at its 57th Annual Meeting to be held in conjunction with that of the National Tuberculosis Association in Miami Beach, Fla., May 20-23, 1962. Abstracts must be in the hands of the program committee not later than Jan. 5.

Further information may be obtained by writing Dr. Asher Marks, chairman of the Medical Sessions Committee, American Thoracic Society, 1790 Broadway, New York 19, N.Y.

Psychosomatic Society Inviting Abstracts for Annual Meeting

The 19th Annual Meeting of the American Psychosomatic Society will be held at the Sheraton Hotel in Rochester, N.Y., Mar. 30-April 1, 1962.

The Program Committee will welcome abstracts of original work to be presented at the meeting by either members or nonmembers of the Society. Abstracts should be not more than two typewritten pages, and should be submitted in 11 copies. Deadline for submission is Dec. 1, and should be addressed to the Chairman, 265 Nassau Road, Roosevelt, N.Y.

Pennsylvania Revises Internship Requirements

Effective July 1, 1961, the State Board of Medical Education and Licensure of the State of Pennsylvania is approving a Straight Internship and a Mixed Internship in addition to the Rotating Internship, subject to certain conditions. Readers will find the Internship Requirements listed in detail in the May 27 issue of J.A.M.A.

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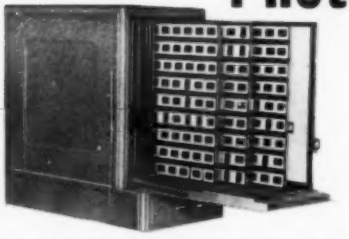

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INTERNIST: To direct Pulmonary Disease Section of a large general hospital closely affiliated with medical school. Faculty appointment. Broad clinical, research, and teaching opportunities. Active Pulmonary Function Laboratory. Contact: Chief, Medical Service, V.A. Hospital, Albany, N. Y.

MEDICAL SERVICES DIRECTOR: To have full charge of all medical and surgical activities for Kern County General Hospital System, under administrative direction of Hospital Administrator; direct and coordinate medical services, supervise operation of intern and resident teaching programs. M.D. degree from approved medical school, approved internship, completion of approved residency and three years experience in practice of medicine, two years of which must have been in teaching or supervisory capacity. Certification by an American Board. California M.D. license. Salary $15,228 to $18,504 annually. Write to: C. Leon Bryson, Kern County General Hospital, 1830 Flower St., Bakersfield, Calif.

RADIOLOGIST: To assist staff radiologist in operation of X-ray department at Kern General Hospital including supervision of technical employees, assisting in resident physician training. Active department. Possession of valid license to practice medicine in California required; certification or eligibility for certification by American Board of Radiology is desirable. Salary $11,928 to $14,508. Write to: Kern County General Hospital, 1830 Flower Street, Bakersfield, Calif.

MEDICAL EDUCATION DIRECTOR: Board Certified or comparable to requirements for Board Certification to direct an approved internship and residency program. Two hundred sixty-six bed community hospital with medical school affiliation in University City. Write and include curriculum vitae: Arthur V. Crandall, Administrator, Brackenridge Hospital, Austin, Texas.

EPIDEMIOLOGIST: A newly established, full-time faculty position now available. Candidates with medical degree preferred. Background and experience in epidemiology and biostatistics required: background in infectious disease studies with overseas field experience desirable. Duties will include organizing and directing training program in epidemiology and biometrics at a World Health Training Center now under development at this medical school. Opportunities will be available for field studies at overseas base. For further information, contact George Entwisle, M.D., Chairman, Department of Preventive Medicine and Rehabilitation, University of Maryland School of Medicine, Baltimore 1, Md.

MEDICAL EDUCATION COORDINATOR: Progressive general hospital in East desires full-time M.D. to coordinate expansion of educational program for interns and residents; educational potentialities unlimited; abundant service patients; 40 Boarded specialists representing all fields; research program contemplated; cardiac catheterization under development. Address: Paul G. Wedel, Administrator, The Williamsport Hospital, 777 Rural Avenue, Williamsport, Pa.

BACTERIOLOGIST: University Hospital has a vacancy for a medically qualified bacteriologist. Appointment also carries a university teaching position. Salary $10,000-$14,000 per annum. Applicants should have hospital experience. Applications stating date of birth, qualifications, experience, present appointment, and the names of three references should be sent to the Director of Bacteriology, University Hospital, Saskatoon, Saskatchewan, Canada.

MEDICAL TECHNOLOGIST: ASCP Registered medical technologist (female) with Bachelor's degree and 2 years experience to work in curriculum of medical technology, department of pathology. Position is chiefly assisting in administration and teaching. Salary open, dependent upon qualifications. Reply: Dr. J. F. Kuzma, Director of Department of Pathology, Marquette University School of Medicine, Milwaukee 3, Wisc.

MEDICAL LIBRARIAN: University desires Medical Librarian at an initial salary of $6,500. The successful candidate will receive faculty status equivalent to that of departmental chairman in the Faculty of Medicine. Duties will include full responsibility for the administration of the Medical Library. Minimum qualifications must include the Medical Library Association Grade I certificate, or its equivalent, with some experience in library administration. Applications should be addressed to the Chief Librarian, Macdonald Memorial Library, Dalhousie University, Halifax, Nova Scotia.

BIOCHEMIST: Junior staff position open in expanding biochemistry department of mid-western medical school. Teaching and research. Opportunity for advancement. Salary competitive. Valuable fringe benefits. Address: V-112.

PHYSICIANS: County hospital affiliated with three medical schools, desires qualified full-time physicians for intern and resident teaching and patient care responsibilities in following fields: internal medicine, general surgery, pediatrics, psychiatry, obstetrics and gynecology, radiology, forensic pathology, director of outpatient clinic, and physician experienced in rehabilitation to direct long term medical care program. All starting salaries over $14,000. Include curriculum vitae with inquiry to: F. G. Gillick, M.D., Santa Clara County Hospital, San Jose-Los Gatos Road, San Jose 28, Calif.

PATHOLOGIST: Board certified or Board eligible pathologist for position combining hospital pathology, teaching in school of medicine and research. Applicant should be interested in both clinical pathology and pathologic anatomy. Compensation and rank dependent upon qualifications. For further information address: Theodore L. Perrin, M.D., The Creighton University School of Medicine, 302 N. 14th St., Omaha 2, Nebr.

ANATOMIST: Two positions open; one in gross and one in neuroanatomy. The Ph.D. required in Anatomy, or in Biology with practical experience. Salary and working conditions good; research field optional. Address: V-113.

PHYSIOLOGIST: Full-time appointment. Gastroenterologist or neurophysiologist preferred. Teaching responsibilities with medical, dental, pharmacy, or graduate students; conduct independent research program. Stimulating environment. Rank and salary based on qualifications. Address V-114.

To aid in solution of the problem of faculty vacancies, MEDICAL EDUCATION will list persons and positions available, as a free service. The school department or person may have the option of being identified in these columns or of being assigned a key number for each position listed. Mail addressed to key numbers will be forwarded to the person or department listing the request.

Information for these columns should reach the Personnel Exchange, Journal of Medical Education, 2530 Ridge Avenue, Evanston, Illinois, not later than the 10th of the month which precedes the month in which the listings will appear.

Personnel Available

PSYCHIATRIC SOCIAL WORKER: Female, M.S., personal psychoanalysis. Three years experience in delinquency problems. Current appointment in medical school involves participation in clinical and teaching program in department of psychiatry. Desires similar position or other psychiatric clinical appointment. Southern California preferred. Available July 1, 1961. Address: A-484.

INTERNIST: Age 34, single, male. Currently on faculty of British Colonial medical school. Postgraduate training in clinical medicine and research. Experience in cardiac catheterisation and haemodynamic investigations; also in life insurance medicine and some private consultative practice. Numerous publications. Desires faculty appointment or fellowship with opportunity for cardiological investigation. Address: A-485.

OBSTETRICIAN-GYNECOLOGIST: Age 35, PBK. AOA. Desires head administrative appointment in medical school or affiliated hospital, with opportunity to develop department. Ability in creative research, teaching, and operative gynecology. Institution must allow to be earned or pay a minimum of $30,000. Address: A-486.

SURGEON-THORACIC: Age 34. Currently engaged in thoracic surgery residency training which includes all phases of pulmonary resectional surgery. Wide experience in heart surgery. Desires full-time medical school appointment, balanced between teaching, research, and dog laboratory research. Address: A-487.

MICROBIOLOGIST: Ph.D. Many years experience in clinical bacteriology and mycology. Excellent background in parasitology and virology. Well qualified in many phases of public health microbiology. Medical school and A.S.C.P. teaching experience as well as administrative responsibilities. Publications. Desires challenging appointment in medical school. Address: A-488.

ANATOMIST: Ph.D. Male, age 43. Fifteen years teaching experience. Currently assistant professor teaching neuroanatomy and gross anatomy in school of medicine and dental medicine. Also experienced in histology and physiology. Trained in educational methods and testing. Desires opportunity for teaching and research in anatomy department or in a correlated pre-clinical medical program. Address: A-489.

OBSTETRICIAN-GYNECOLOGISTS M.B.B.S., India; F.R.C.S., Canada. University trained in U.S., immigrant to U.S. Desires teaching position, department of obstetrics and gynecology in a hospital with active educational program. Address: A-490.

MEDICAL PHOTOGRAPHER: A.B., age 35. Ten years experience in medical photography (including 7 years with Veterans Administration). Special training in photomicrography. Fluent knowledge of German. Desires position with medical school and/or hospital affiliated with medical school. Good references. Resumé and references on request. Address: A-491.

PHYSIOLOGIST: Ph.D., assistant professor. Long-term research program with staff of four based on continuing large N.I.H. grants. Basic and clinical aspects of endocrine physiology. Major physiology teaching responsibilities and experience. Seeks associate professorship in physiology. Address: A-493.

PHARMACOLOGIST: M.D., Punjab University, India. Age 27, married, one child. Publications, *Ind. J. Med. Sc.* and *J. Am. Pharm. Assn.* Presently research assistant, department of pharmacology, University of Agra. Desires position with U.S. medical school with opportunity for postdoctoral study. Address: A-494.

PSYCHIATRIC SOCIAL WORKER: M.A., University of Chicago School of Social Service Administration. Desires position as teacher of psychiatric social work to medical students. Twelve years experience as chief psychiatric social worker in two medical schools. Address: A-495.

BIOPHYSICIST-PHYSIOLOGIST: Ph.D., M.S., E.E., wishes faculty appointment, teaching and research. Publications, books. Areas of research interest—bioelectric studies, origins of congenital heart disease, biomedical engineering. Address: A-496.

PHYSIOLOGIST-PHARMACOLOGIST: Ph.D., faculty member of medical school. Teaching experience. Research in endocrine physiology and pharmacology of endocrine preparations. Publications and Society memberships. Desires teaching and/or research position with opportunity for independent research. Address: A-497.

MICROBIOLOGIST-IMMUNOLOGIST: Research and teaching experience in bacteriology and parasitology. Presently on medical school faculty. Desires faculty appointment appropriate for qualifications with opportunity for independent research. Would also consider a position in a medical foundation or in a City, County, or Federal Institution affiliated with a medical school. Address: A-498.

PREVENTIVE MEDICINE-PUBLIC HEALTH: Physician with M.D., Dr.P.H. degrees desires senior teaching position on medical school or public health school faculty. Numerous publications. Previous research, teaching, administrative and health department experience. Special interests are epidemiology, preventive medicine, and biostatistics. Address: A-499.

INTERNIST: M.D., M.S. in Med. Certified. Age 46. Wishes to abandon lucrative private practice of 18 years for full-time (or half-time) medical school appointment that includes teaching, OPD, and hospital practice. Extensive clinical experience and original publications in psychosomatic medicine. Capable of organizing and heading a psychosomatic division that will integrate general medicine and psychiatry. Address: A-500.

ANATOMIST: Ph.D. (Anatomy) March 1961. M.S. in Zoology and B.S. in Biology. Age 39, married, child. Presently teaching biology in midwest. Prefers return to anatomy since Ph.D. completed. Twelve years full-time teaching experience, including four in anatomy (histology, embryology, gross, comparative, and neurology). Publications. Research interests in histochemical aspects of mammalian development; program in progress. Prepared to contribute to graduate research training programs. References. Address: A-501.

PHYSIOLOGIST: Ph.D., age 39. Desires faculty appointment, teaching and research. At present associate professor of physiology in medical school. Teaching experience and research in respiratory physiology and neuropharmacology. Salary open. Address: A-502.

PHYSIOLOGIST: Ph.D., age 41. Also E.E. degree in electronics. Wide experience in cardiopulmonary and cardiac electrophysiology as well as medical instrument design. Member of American Physiological Society and Institute of Radio Engineers, etc. Assistant professor of physiology. Seeks faculty position in medical school or in a cardiopulmonary laboratory associated with teaching and research. Address A-503.

PREVENTIVE MEDICINE: M.D., certified in internal medicine and in a subspecialty, desires position in university department of occupational medicine or preventive medicine. Trained at Mayo Clinic and in university. Experience includes clinical investigation, medical school faculty and private practice. Address: A-504.

PATHOLOGIST: Age 39; Certified (FCAP 1961). Also three years internal medicine. Experienced director of hospital laboratory and director, school of medical technology. Experienced in new laboratory designing. Extensive work in all fields of medical education, recruiting, all medical specialties, research personnel. Interested in cancer research etiology, early diagnosis, genetics, especially leukemias and lymphomas. Prefer establishing laboratories and programs in organizations or institutions, new or in building process. Address: A-505.

BIOCHEMIST: Ph.D., age 50. Will resign as research director of small drug firm for teaching-research appointment. Some medical school teaching experience early in career, but can offer extensive experience to teaching, to research (lipid metabolism; nutrition), and to cooperative projects with clinical and preclinical associates. Desires research or career professorship. Prefers no administrative duties. Address: A-506.

ALLERGIST: Age 40, board certified in allergy and pediatrics. Currently teaching part-time. Seeking full-time teaching position. Address: A-507.

DEVELOPMENT CONSULTANT OR ADMINISTRATOR: Desires position as consultant or administrator for new medical school establishment, or expansion of approved school. Fund raising background capped by six years as Executive Secretary, A.M.E.F. Recently launched program for new Saint Paul Medical School. Address: A-508.

PHARMACOLOGIST-ADMINISTRATOR: Ph.D., age 38. Ten years administrative, teaching and industrial research experience including international as well as Stateside assignments. Research interests in industrial toxicology, neuropharmacology and screening procedures. Teaching experience includes medical, dental, nursing, graduate and postdoctoral duties. Interested in academic administrative post, research coordination and graduate education. Available early in 1962. Address: A-509.

MEDICAL ADMINISTRATOR: M.D., Ph.D. in neurophysiology, neuropharmacology. Experience in administrative clinical research post. Some teaching experience. Strong interest in medical education. Desires either a full-time medical college administrative post or combined with basic science teaching position in physiology or pharmacology. Address: A-510.

INTERNIST: Age 43, board-certified with subspecialty interest in gastroenterology. Extensive teaching and administrative background. Interested in change of location, preferably to the northern half of U.S. Interests predominantly clinical and teaching with some research. Address: A-511.

PEDIATRICIAN: M.D., M.P.H., age 35. Certified pediatrician, with five years experience in pediatrics and pediatric allergy, teaching and staff duties at community hospitals and metropolitan teaching hospital. Seeking administrative position. Address: A-512.

PHYSIOLOGIST-BIOCHEMIST: Ph.D., age 32. Present rank assistant professor. Experienced with isotopic and biochemical techniques applied to basic problems in endocrinology, metabolism, and cellular physiology. Publications and societies. Extensive teaching experience. Desires career faculty appointment in physiology or biochemistry with opportunity for independent research. Available Spring 1962. Address: A-513.

PEDIATRICIAN: Diplomat; teaching experience; publications. Desires faculty appointment in U.S. medical school. Presently located in Canada. Address: A-514.

MICROBIOLOGIST-INTERNIST: M.D., Ph.D., Qualified medical scientist, age 46, desires full-time position as Chief, Division Infectious Disease and/or Head, Microbiology Department of medical school with associated rank in internal medicine. Experienced in teaching, administration and medical practice. National Science Foundation grantee; 50 research publications, one book. Eastern location preferred. Address: A-515.

PHYSIOLOGIST: M.B.B.S. (Bombay, India), M.D.; age 34. Seven years teaching experience as lecturer in Bombay medical college. Present position, assistant professor of physiology. Seeking position in U.S. medical school, involving research with opportunity for earning Ph.D. degree in U.S.A. or Canada. Address: A-516.

ANATOMIST: M.B.B.S.; M.Sc. (Med.). Age 45. Thirteen years teaching experience in anatomy, Bombay medical college. Currently assistant professor of anatomy. Also experience in histology. Desires faculty position as professor or assistant professor of anatomy or histology or in a correlated preclinical teaching program. Address: A-517.

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1. The Composition of Milks, Publication 254, National Academy of Sciences and National Research Council, Revised 1953. 2. Brown, G. W.; Tuholski, J. M.; Sauer, L. W.; Minsk, L. D., and Rosenstern, I.: J. Pediat. *56*:391 (Mar.) 1960.

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